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ABSTRACT

The labor market outcomes of non-college-bound high school graduates were examined by analyzing the 1980 High School and Beyond Fourth Follow-up Survey, which contains information on more than 14,000 former high school students who were interviewed in 1980 as sophomores and again in 1982, 1984, 1986, and 1992. The study concentrated on respondents who had not pursued more than 5 months of postsecondary education after graduation. The analysis generally confirmed the previously discovered modest association between high school coursework and females' short-term labor market outcomes. Grades in high school were also modestly associated with early labor market outcomes for males and females; however, these associations had disappeared by 1991. Taking vocational courses was either associated with poorer earnings or not significantly associated with economic outcomes in 1983 and 1991. The one exception was credits earned in specific labor market preparation courses, which were associated with higher earnings and weeks employed for females in 1983. Working while in high school proved beneficial to new graduates and was positively associated with both early and later labor market success for female graduates. The following items are appended: regression equation results; issues with the Fourth Follow-up data; the classification scheme for non-college-bound students; a glossary; and technical notes. (Contains 17 tables/figures.) (MN)

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U.S. Department of Education
Office of Educational Research and Improvement
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Labor Market Outcomes of Non-College-Bound High School Graduates

Statistical Analysis Report

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Labor Market Outcomes of Non-College-Bound High School Graduates

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Executive Summary

While most young people enroll in postsecondary education shortly after graduating from high school, not all choose this path. A minority of high school students—referred to as the "non-college-bound"—go directly into the labor market after obtaining their high school diploma. How these students fare in this world of work is of direct concern for educators. The United States economy in the late 1980s has been characterized as one that demanded high skills of workers and that persons ill prepared for this new economy would not do well in it. It was also feared that the high school curriculum of the day did not adequately train students for the workplace.

Previous research analyzing the relationships between high school experiences and labor market outcomes suggests that while secondary academic and vocational courses provide only small wage benefits in the first few years after graduation, academic achievement and high school work experience are associated with labor market success.[1] For example, there appears to be modest evidence that academic coursework is rewarded by employers, despite their claims that it is general skills that they would like young workers to bring into the workplace.[2] Rumberger and Daymont found that taking additional academic courses including mathematics, English, science, social science, and foreign languages significantly reduced the unemployment rates of young men and women who did not go to college and significantly increased the wage rate and number of hours worked for women.[3] On the other hand, Bishop found evidence indicating that taking a greater number of semesters of academic courses negatively affected employment and earnings.

This report uses data from the High School and Beyond Fourth Follow-up to examine the labor market outcomes of a cohort of non-college-bound students who graduated high school in 1982. Many of the previous studies of non-college-bound youth cited above have examined the economic returns to education immediately following high school or perhaps 2 or 3 years after graduation. This study uses longitudinal data to examine not only these short-term outcomes, but also the economic returns to high school experiences a decade after the cohort graduated high school.

The High School and Beyond Study was used to examine economic status of non-college bound high school graduates in 1983—one year after most had graduated from high school—and 1991, 9 years after scheduled graduation. The findings generally confirmed previous research showing a modest association of high school coursework

[1]U.S. Department of Education, *National Assessment of Vocational Education Final Report to Congress, Volume II* (Washington, D.C.: 1994); John Bishop, "High School Graduates in the Labor Market" (Canton, Ohio: National Center for Research in Vocational Education, 1985); Robert H. Meyer and David Wise, "High School Preparation and Early Labor Force Experience" (Working Paper no. 342) (Washington, D.C.: National Bureau of Economic Research, Inc., 1979).

[2]Secretary's Commission on Achieving Necessary Skills (SCANS), *What Work Requires of Schools: A SCANS Report for America 2000* (Washington, D.C.: U.S. Department of Labor, 1991).

[3]Russell Rumberger and Thomas Daymont, *The Economic Value of Academic and Vocational Training Acquired in High School* (Stanford, CA: Institute for Research on Educational Finance and Governance, 1982).

with females' short-term labor market outcomes. Grades in high school also had modest associations with early labor market outcomes for both males and females. However, these associations were short lived and had disappeared by 1991.

The number of vocational courses taken was either associated with poorer earnings and unemployment or resulted in non-significant association with economic outcomes in both 1983 and 1991. The one exception was credits earned in specific labor market preparation (SLMP) courses: as the number of SLMP credits earned rose, so did the earnings and weeks employed for females in 1983.

Working during high school was prevalent among members of the non-college-bound cohort of 1982, and the findings indicate that the experience was beneficial to new graduates as they made a transition into the labor force.In addition, work experience in high school was positively associated with both early and later labor market success for female graduates.

Controlling for personal characteristics, this study found that academic achievement and work experience while in high school were positively related to several measures of short-term labor market success for non-college-bound students, although females appeared to benefit more than males. Students who either earned higher grades in SLMP and academic courses or who worked during high school tended to earn more and were employed more consistently than their peers their first year out of high school. On the other hand, the associations between the labor market experiences and academic and vocational course taking of the non-college-bound population were generally not significant—in either the short term or long term. In other words, what this group of students actually took in high school, after controlling for demographic characteristics, does not appear to matter to their short or long term earnings nor their long-term employment status.

Acknowledgments

This report was produced under the direction of John Ralph, Program Director, Data Development Program, Early Childhood, International, and Crosscutting Studies Division. Many individuals made substantial contributions to this report. James D. Houser, formerly at NCES and now with the Office of the Under Secretary, and John Tuma, formerly at MPR Associates, originally planned the analysis in this report. Valeria Perez-Ferreiro, also formerly at MPR Associates, wrote the initial drafts of the report and did the preliminary data analysis, while programmer Ellen Liebman supplied invaluable knowledge and wisdom concerning the High School and Beyond data throughout the project.

Numerous members of the NCES staff provided assistance and guidance for this report. Ellen Bradburn reviewed drafts of the report and provided useful comments on technical aspects of the analysis and substantive comments on the implications of the findings. Dawn D. Nelson and Lisa Hudson also provided direction and support through the life of this project.

Without the assistance of the following staff at MPR Associates this report could not have been produced: Barbara Kridl (overall production and proofreading), Francesca Tussing (production, proofreading, layout, and editing), Andrea Livingston (editing), and Leslie Retallick (figure design and text layout). They provided invaluable editorial, graphic, and production assistance.

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Introduction

During the past two decades, many reports have been issued that criticize the American high school preparation of non-college-bound youth—those graduates who were not pursuing postsecondary education, but instead were entering the job market directly from high school. In such publications as *The Forgotten Half: Non-College-Bound Youth in America*, reformers argued that high schools were not adequately preparing these students for the work force they were about to enter. They believed that the increasingly competitive international labor market for unskilled workers, coupled with the inadequate preparation that students were receiving through the high school curriculum, was producing a subclass of young people with few job prospects.[1] While the rhetoric of these reports may have been overstated (about 80 percent of the high school students eventually enrolled in postsecondary education[2]) policy-makers took these criticisms seriously. Thus, there were calls for educational reform that focused more directly on the shortcomings of high school for non-college-bound students.

To learn more about how best to allocate educational resources so that students can connect with and perform in jobs, policymakers funded numerous studies analyzing what kinds of high school preparation and experiences are presumed to prepare youth to enter the labor market and how these types of high school experiences affect the labor market outcomes of former students. Most studies divided the various types of training and experiences that students receive during high school into three broad categories: academic education in which students develop their reading, writing, and mathematics skills; vocational training in which students acquire the skills necessary to perform particular occupational tasks; and high school work experience in which many students, particularly non-college-bound youth, develop a knowledge of the workplace and technical skills. Research analyzing the relationships between high school experiences and labor market outcomes suggests that while secondary academic and vocational courses provide only small wage benefits in the first few years after graduation, academic achievement and high school work experience are associated with labor market success.[3]

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[1]The William T. Grant Foundation on Work, Family, and Citizenship, *The Forgotten Half: Non-College-Bound Youth in America* (Washington, D.C.: 1988).

[2] Based on data tabulated from the High School and Beyond Sophomore Cohort Data Analysis System.

[3]U.S. Department of Education, *National Assessment of Vocational Education Final Report to Congress, Volume II* (Washington, D.C.: 1994); John Bishop, "High School Graduates in the Labor Market" (Canton, Ohio: National Center for Research in Vocational Education, 1985); Robert H. Meyer and David Wise, "High School Preparation and Early Labor Force Experience" (Working Paper no. 342) (Washington, D.C.: National Bureau of Economic Research, Inc., 1979).

The evidence regarding whether vocational training affects labor market outcomes is mixed. In their analysis of male high school graduates using data from the National Longitudinal Study of 1972 High School Seniors (NLS–72), Meyer and Wise found that high school training, whether vocational or industrial, was not related to wages or employment.[4] On the other hand, Grasso and Shea, in their analysis regarding the impact of a vocational program on NLS youth, reported significantly higher earnings for women who took vocational courses in their place of business or office.[5] In a literature review on the topic, the National Assessment of Vocational Education (NAVE) reported that high school graduates who concentrated their coursework in a particular field and *found work related* to that field typically earned more and were less likely to be unemployed than those with a more general education background.[6] Bishop maintains that one reason the differences in wages and earnings were small between those with occupational training and those without it is that many students do not find employment related to their field of study, and there are no real benefits to occupational training unless it leads to such related employment.[7]

Similarly, there appears to be only modest evidence that academic coursework is rewarded by employers, despite their claims that it is general skills that they would like young workers to bring into the workplace.[8] The research cited by NAVE ". . . suggests that academic courses in high school provide small benefits to wages in the first few years after graduation for those students not continuing on to college," although young women appear to benefit more than young men."[9] Rumberger and Daymont found that taking additional academic courses including mathematics, English, science, social science, and foreign languages significantly reduced the unemployment rates of young men and women who did not go to college and significantly increased the wage rate and number of hours worked for women.[10] On the other hand, Bishop found evidence indicating that taking a greater number of semesters of academic courses negatively affected employment and earnings. Bishop also identified two reasons why small differences in academic education are not well rewarded in the labor market. First, small differences in attainment are not "signaled" with sufficient clarity through transcripts, recommendations, or test scores for employers to use them effectively. Second, both workers and employers appear to pre-

[4]Meyer and Wise, "High School Preparation and Early Labor Force Experience," 50.

[5]John Grasso and John Shea, *Vocational Education and Training: Impact on Youth* (New York: Carnegie Foundation for Advancement of Teaching, 1979).

[6]U.S. Department of Education, *National Assessment of Vocational Education Interim Report to Congress, Volume II* (Washington, D.C.: 1994).

[7]Bishop, "High School Graduates in the Labor Market."

[8]Secretary's Commission on Achieving Necessary Skills (SCANS), *What Work Requires of Schools: A SCANS Report for America 2000* (Washington, D.C.: U.S. Department of Labor, 1991).

[9]U.S. Department of Education, *National Assessment of Vocational Education Final Report to Congress, Volume II,* 388–392.

[10]Russell Rumberger and Thomas Daymont, *The Economic Value of Academic and Vocational Training Acquired in High School* (Stanford, CA: Institute for Research on Educational Finance and Governance, 1982).

fer relatively equal pay among workers with similar jobs, even when skill and productivity differences exist.[11]

A growing body of evidence suggests that measures of general ability are better at predicting performance at work than are measures of specific abilities or job skills. Citing work by Murnane et al. and Gamoran, NAVE reported that higher general ability scores and better specific mathematics skills were related to higher wages among workers with no postsecondary education.[12] Furthermore, participation in honors English also appears to contribute to better labor market outcomes. Supporting this finding, Bishop observed that females with higher grade-point averages (GPAs) earned more and worked more consistently 16 months after graduation from high school than did other females.[13] In all of these instances, although the wage effects tended to be small initially, they increased over time. By contrast, Meyer and Wise found a positive relationship between higher mathematics test scores and employment opportunities, and these benefits appeared immediately after students left high school.[14]

Considerable evidence exists that students who work while attending high school fare better in the labor market than those with no high school work experience.[15] For instance, Meyer and Wise observed that working a greater number of hours while in high school is significantly related to working more weeks per year upon graduation. In addition, those who worked in high school tended to receive higher hourly wages. Likewise, compared to other students, students who participated in cooperative education (co-op) or work–study programs were found to be more positive about their school experiences and to have a better understanding of how school learning and work experiences are linked. Moreover, co-op students who stayed with the same employer once they left school did appear to realize a wage and earnings premium.[16]

Clearly, the large body of literature on labor market outcomes sheds light on the relationships between outcomes measures and various measures of educational experience. However, because long-term longitudinal data were not available, most previous research focused on labor market returns to education immediately after leaving high school or perhaps 2 or 3 years after graduation. This study uses previously unanalyzed data to track former students' labor market

[11]John Bishop, "The Impact of Academic Competencies on Wages, Unemployment, and Job Performance," *Carnegie-Rochester Conference Series on Public Policy,* no. 37 (1992), 127–194.

[12]U.S. Department of Education, *National Assessment of Vocational Education Final Report to Congress, Volume II,* 147–149.

[13]Bishop, "High School Graduates in the Labor Market."

[14]Meyer and Wise, "High School Preparation and Early Labor Force Experience."

[15]David Crawford, Amy Johnson, and Anita Summers, *Schools and Labor Market Outcomes* (Philadelphia, PA: National Center on the Educational Quality of the Workforce, 1995); U.S. Department of Education, *National Assessment of Vocational Education Interim Report to Congress, Volume II*; David Stern, Neal Finkelstein, James R. Stone III, John Latting, and Carolyn Dornsife, *Research on School-to-Work Programs in the United States* (Berkeley, CA: National Center for Research in Vocational Education, March 1994).

[16]Stern et al., *Research on School-to-Work Programs in the United States,* 14–18.

outcomes immediately upon graduation as well as a decade later. Toward this end, this report will analyze the relationship between the high school course-taking patterns, academic achievement, and work experiences of non-college-bound students and their subsequent labor market outcomes during the year after graduation and 10 years later. More specifically, this paper will address the following questions:

1) What is the impact of vocational and academic curricula on labor market experiences?
2) Is there a strong positive relationship between high school academic achievement and labor market success?
3) How does high school work experience or participation in co-op programs influence labor market outcomes?
4) Do these effects persist over time?

Method

Data

This analysis used data from the 1980 High School and Beyond (HS&B) Fourth Follow-up Survey to examine the labor market experiences of non-college-bound high school graduates. The Fourth Follow-up contains information on more than 14,000 former high school students who were interviewed in 1980 as sophomores, and again as seniors or dropouts in 1982. These students were also interviewed in 1984, 1986, and 1992. This data source provides information about students' families, academic ability and achievement, work experience (both in high school and after graduation), and the types of courses they took in high school. In addition, the HS&B data contain information about the number of jobs students held in a given year, their starting and ending dates of employment, earnings, number of months out of the labor force, and job training, allowing for more refined analyses.

Unfortunately, this analysis could not take full advantage of the longitudinal character of the HS&B survey because there appears to be a discrepancy in the self-reported employment status data between the Third Follow-up in 1985–86 and the Fourth Follow-up in 1992. (See appendix C for further discussion.) Instead of using all of the longitudinal data, this analysis used data from just two time points—February 1983, the year after the cohort graduated from high school, and February 1992, 10 years after graduation.

This report concentrates on the survey respondents who did not pursue more than 5 months of postsecondary education after graduating from high school.[17] "High school graduates" are defined as those who were identified as such in the transcript or survey files and for whom there are completed high school transcripts. A complete transcript is one that shows that the student earned between 16 and 32 credits, with credits earned in English. These restrictions narrowed the sample size to 1,745 former students.[18]

The labor market outcomes examined in the study include earnings, weeks employed, weeks unemployed, and weeks not in the labor force as indicators of labor market success for

[17]This sample thus includes some former students with some (less than 5 months) postsecondary experience. Five months of postsecondary experience may not be inconsequential. Therefore, this may have some impact on the findings here.

[18]For a more detailed description of how this study's sample was derived, see appendix D, which provides a flow chart illustrating which individuals were excluded from the study.

1983 and 1991.[19] The study focused on how these measures of labor market success are associated with student socioeconomic status (SES) and personal characteristics, course-taking patterns, academic performance, and work experience while in high school. Several studies suggest that high school experiences affect subsequent labor market outcomes differently for males and females.[20] Consequently, the results are presented separately for each gender. The following chart helps clarify the different sets of independent variables used in this analysis:

Chart of Independent Variables

Personal characteristics

Demographic	*Family background*	*Prior achievement*
Race/ethnicity	Socioeconomic status	Standardized mathematics test score

High school experience (self reported data)

Program area	*Specialization*
Vocational	College prep
Academic	Vocational concentrator
Both	Sampler
	Limited concentrator

High school experience (transcript data)

Vocational concentration[21]	*Advanced mathematics and English*	*Course taking*
None	Advanced English	Carnegie units
Agriculture	Algebra	• Overall
Business	Geometry	• Academics
Marketing	Advanced mathematics	• Vocational
Health		• English
Occupational home economics		• Mathematics
Trade and industry		Specific labor market
Technology and communication		preparation (SLMP) courses

High school work experience

Number of hours worked in high school
Participated in co-op program

Academic achievement

Grades in academic courses
SLMP grades

[19]Definitions of all variables used in this analysis can be found in appendix E.

[20]U.S. Department of Education, *National Assessment of Vocational Education Final Report to Congress, Volume II*; Bishop, "High School Graduates in the Labor Market."

[21] Vocational concentrators are the students who completed 3 or more credits in an specific labor market program area.

Characterizing Non-College-Bound High School Graduates

Aggregate information regarding high school and labor market outcomes for non-college-bound graduates is readily available. Research consistently reports that, on average, these former students earn lower grades, perform relatively poorly on standardized exams, and enroll in relatively easy high school curricula. During the initial years following high school graduation, employment patterns of these students tend to be relatively turbulent, as their rates of labor market participation, employment, and unemployment fluctuate before settling into a stable long-term pattern a few years later. The analyses shown below are consistent with these earlier findings.

Labor Market Outcomes

Tables 1 and 2 present the means and standard errors of the high school and labor market variables for male and female students, and for non-Hispanic white, non-Hispanic black, and Hispanic students.[22] Consistent with other evidence, there was some "churning" with respect to the percentage of graduates in the labor force and the percentage employed in 1983, but by 1991, both of these measures had stabilized. On average, these former students were employed 34 weeks in 1983 and 43 weeks in 1991. While they were unemployed for 4 weeks during the year following graduation, the figure dropped to about 3 weeks in 1991. In addition, on average, the HS&B cohort was out of the labor force for 13 weeks in 1983. Eight years later, the cohort was more consistently employed, averaging 6 weeks out of the labor force. However, even though these former students were consistently employed, their earnings were relatively low. Mean self-reported annual earnings in current dollars in 1983 and 1991 for the entire non-college bound cohort were $11,100 and $17,800, respectively. This compares with mean annual earnings of $6,200 and $22,500 respectively for all members of the sophomore class of 1980.[23]

There was considerable variation in the mean labor market outcomes within this population of non-college-bound graduates, particularly among males and females and different racial/ethnic groups. In 1983, male graduates worked 5 more weeks and were unemployed for 1.44 fewer weeks than female graduates. While the young men did not earn significantly more than the young women in 1983, the earnings gap between the sexes increased to $10,000 by 1991. The men were more consistently employed 9 years after high school graduation, working about 11 more weeks than the women. Also, in 1983 and 1991, female graduates were out of the labor force more weeks than their male peers. Thirty-seven percent of the female graduates in the

[22]Unfortunately, there were not a sufficient number of cases representing Asian/Pacific Islanders and American Indian/Alaskan Natives to generate reliable estimates.

[23] Based on data tabulated from the High School and Beyond Sophomore Cohort Data Analysis System.

Table 1—Means and standard errors for variables regarding high school and labor market outcomes of non-college-bound students, disaggregated by sex: 1983 and 1991

	Total		Males		Females	
	Mean	(SE)*	Mean	(SE)*	Mean	(SE)*
Variable						
Earnings 1983 ($)	11,127	305.5	11,595	415.0	10,609	444.3
Earnings 1991 ($)	17,810	384.9	22,440	529.3	12,303	460.4
Weeks employed 1983	34	0.7	37	0.9	32	0.9
Weeks employed 1991	43	0.5	48	0.5	37	0.9
Weeks unemployed 1983	4	0.3	4	0.5	5	0.5
Weeks unemployed 1991	3	0.3	2	0.2	5	0.6
Weeks not in the labor force 1983	13	0.6	12	0.9	15	0.9
Weeks not in the labor force 1991	6	0.4	1	0.4	10	0.8
Total credits (number)	20	0.1	20	0.1	21	0.1
Academic credits	12	0.1	12	0.1	12	0.1
Mathematics credits	2	0.0	2	0.0	2	0.0
English credits	4	0.0	4	0.0	4	0.0
Vocational credits	6	0.1	6	0.1	6	0.1
Specific labor market preparation credits	4	0.1	4	0.1	3	0.1
Course taking (% taking)						
Advanced English	2	0.6	2	0.5	3	0.7
Less than Algebra 1	49	1.6	51	2.2	48	2.0
Algebra 1	22	1.3	20	1.9	23	1.8
Geometry	12	1.0	12	1.3	11	1.3
Advanced mathematics	17	1.5	17	1.6	18	1.5
GPA (% receiving)						
Mostly A's	5	0.6	2	0.6	8	1.1
Mostly B's	22	1.2	18	1.5	27	1.8
Mostly C's	61	1.4	66	1.9	55	2.1
Less than C's	12	0.9	12	0.9	10	1.2
Specific labor market preparation GPA (% receiving)						
Mostly A's	15	1.1	12	1.3	19	1.7
Mostly B's	27	1.4	26	2.0	28	1.9
Mostly C's	42	1.5	44	2.3	40	2.1
Less than C's	16	1.7	18	1.7	13	1.5
Hours worked (% receiving)						
None	27	1.3	20	2.0	34	1.9
1–14	27	1.3	24	1.9	31	2.0
15–21	20	1.3	19	1.9	20	1.7
22–29	11	0.9	15	1.5	6	1.0
30 or more	15	1.1	21	1.8	9	1.2
Co-op program						
Yes	7	0.8	4	0.7	10	1.4
No	93	0.8	96	0.7	90	1.4
Standardized test scores in mathematics (% in quartile)						
Upper quartile	18	1.1	19	1.7	17	1.5
Middle two quartiles	46	1.5	46	2.3	46	2.0
Lowest quartile	36	1.4	35	2.1	37	2.0

*SE indicates standard error.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

Table 2—Means and standard errors for variables regarding high school and labor market outcomes of non-college-bound students, disaggregated by race/ethnicity: 1983 and 1991

	Total		White, non-Hispanic		Black, non-Hispanic		Hispanic	
	Mean	(SE)*	Mean	(SE)*	Mean	(SE)*	Mean	(SE)*
Variable								
Earnings 1983 ($)	11,127	305.5	12,150	377.5	6,888	640.2	9,402	792.1
Earnings 1991 ($)	17,810	384.9	18,301	442.2	16,014	1,126.3	16,713	1,280.7
Weeks employed 1983	34	0.7	36	0.7	28	2.1	32	2.1
Weeks employed 1991	43	0.5	42	0.6	38	1.9	42	1.8
Weeks unemployed 1983	4	0.3	3	0.3	9	1.5	4	0.8
Weeks unemployed 1991	3	0.3	3	0.4	4	1.0	5	1.2
Weeks not in the labor force 1983	13	0.6	13	0.7	15	1.8	16	2.0
Weeks not in the labor force 1991	6	0.4	6	0.5	5	1.3	4	1.4
Total credits (number)	20	0.1	20	0.1	20	0.3	20	0.2
Academic credits	12	0.1	12	0.1	12	0.2	12	0.2
Mathematics credits	2	0.0	2	0.0	2	0.1	2	0.1
English credits	4	0.0	4	0.0	4	0.1	4	0.1
Vocational credits	6	0.1	6	0.1	5	0.3	6	0.2
Specific labor market preparation credits	4	0.1	4	0.1	3	0.3	4	0.2
Course taking (% taking)								
Advanced English	2	0.6	2	0.5	3	2.0	2	0.8
Less than Algebra 1	49	1.6	44	1.9	64	4.6	61	3.2
Algebra 1	22	1.3	24	1.7	11	2.7	21	2.7
Geometry	12	1.0	14	1.3	7	2.5	6	1.5
Advanced mathematics	17	1.5	18	1.4	18	3.6	12	2.0
GPA (% receiving)								
Mostly A's	5	0.6	7	0.9	0	0.3	3	0.9
Mostly B's	22	1.2	26	1.5	15	3.4	15	2.2
Mostly C's	61	1.4	59	1.7	65	4.7	64	3.1
Less than C's	12	0.9	9	1.0	19	3.7	18	2.5
Specific labor market preparation GPA (% receiving)								
Mostly A's	15	1.1	18	1.3	5	1.7	9	1.8
Mostly B's	27	1.4	29	1.7	20	3.9	27	3.1
Mostly C's	42	1.5	42	1.8	42	4.9	45	3.8
Less than C's	16	1.2	11	1.1	33	5.3	20	2.8
Hours worked (% receiving)								
None	27	1.3	25	1.6	38	5.0	28	3.3
1–14	27	1.3	28	1.6	23	3.6	28	3.4
15–21	20	1.3	21	1.6	13	3.3	18	2.5
22–29	11	0.9	12	1.1	9	2.5	10	2.0
30 or more	15	1.1	15	1.3	17	4.1	16	2.7
Co-op program								
Yes	7	0.8	6	0.9	6	1.8	10	2.3
No	93	0.8	94	0.9	94	1.8	90	2.3
Standardized test scores in mathematics (% in quartile)								
Upper quartile	18	1.1	23	1.5	3	1.2	5	1.3
Middle two quartiles	46	1.5	49	1.8	32	4.4	44	3.6
Lowest quartile	36	1.4	28	1.6	65	4.5	51	3.7

*SE indicates standard error.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

sample were married, and 20 percent had children by 1991 (data not shown). Since some of the women in the sample may have worked in the home and had no outside income, some of this variation may be due to the choices females made in terms of employment.

During the year immediately following high school, white non-college-bound graduates tended to have more favorable short-term labor market experiences than did their peers from other racial/ethnic groups.[24] For example, in 1983, white graduates earned an average of $5,000 more than black graduates, and $2,500 more than Hispanic graduates. Also, white graduates were employed more weeks in 1983 and were unemployed fewer weeks than were black graduates. However, in the longer term, there were no statistically significant differences among the various racial/ethnic groups in terms of the four labor market indicators as they were no longer significant by 1993. For example, in 1991 the estimate of average income for white students was only about $2,000 different from the estimate of earnings for black and Hispanic non-college-bound graduates. This difference was not statistically significant.

High School Outcomes

The average non-college-bound student completed about 20 credits in high school, of which 12 were in academic classes, about 6 in vocational courses, and 4 in specific labor market preparation (SLMP) courses. While these students, on average, earned almost 4 credits in English, they completed no more than two courses in mathematics. Furthermore, the vast majority of the students avoided a rigorous academic curriculum in high school. For example, 2 percent of the non-college-bound students completed an advanced English class; almost half never earned a credit in a mathematics course equivalent to Algebra 1; and about 3 in 10 took an advanced mathematics or geometry course. While males and females did not seem to differ significantly in terms of their course-taking patterns (data not shown), white students were more likely to earn credits in higher-level mathematics courses than were black or Hispanic students. For example, twice as many white students as Hispanic students completed a course in geometry.[25]

Very few non-college-bound students had desirable educational outcomes since they earned lower grades and scored relatively poorly on tests. In fact, 1 in 20 students had an average GPA of A in high school, yet 7 out of 10 had a C average or lower. Students who took the standardized test in mathematics were twice as likely to have scored in the bottom quartile as in the top quartile. In addition, the way in which high school grades and test scores were distributed across the population of non-college-bound students varied considerably. For example, females tended to be

[24] For the convenience of the reader, from this point on this report will refer to non-Hispanic white students as simply white students and non-Hispanic black students as simply black students.

[25] About the same percentage of black and white students took advanced mathematics.

more likely to earn an A average than males; however, their standardized test scores in mathematics were similar. White students were almost twice as likely to earn A or B averages as black and Hispanic students. Twenty-three percent of white students scored in the top quartile of the standardized mathematics test, whereas 3 percent of black students and 5 percent of Hispanic students did so.

Almost 75 percent of the students worked while attending high school, with males being more likely to work and tending to work longer hours than females. In fact, 1 in 5 young men worked more than 30 hours per week in high school, but fewer than 1 in 10 young women worked that much. In addition, only 7 percent of the students participated in a co-op program. There were no significant differences in the numbers of hours worked in high school among the various racial/ethnic groups.

Preliminary Analysis

For this report, a preliminary analysis was conducted to determine the relative association of the high school experiences of non-college-bound students with their earnings, weeks employed, weeks unemployed, and weeks not in the labor force. To perform this analysis, the four measures of labor market success for each year were cross-tabulated by the number of vocational and academic courses students completed, their grades in academic and specific labor market preparation (SLMP) courses, and the number of hours they worked in high school. The results are presented in tables 3–5.

Academic and Vocational Course Taking

Table 3 shows the mean value of the four labor market outcomes according to the vocational and academic course-taking patterns of the non-college-bound youth. In 1983, the number of academic credits students earned appeared to be negatively related to their earnings. For example, students who completed 0–11 academic credits earned about $1,500 more than students who earned 12–15 academic credits. On the other hand, students who completed more vocational courses appeared to enjoy somewhat better labor market experiences; however, none of the differences were statistically significant. By 1991, students' labor market outcomes did not seem to vary according to their academic or vocational course-taking patterns.

Academic and Specific Labor Market Preparation Achievement

Table 4 displays the four labor market indicators according to students' academic and specific labor market preparation (SLMP) grades. The results were consistent between the two measures of achievement. Students who earned higher GPAs in academic and SLMP subjects enjoyed greater labor market success in 1983. In fact, students with academic GPAs of A's and B's earned almost twice as much as students with grades below C's. However, this trend did not persist since the earnings gap between the high- and low-achieving students disappeared by 1991.

Table 3—Labor market outcomes according to vocational and academic course-taking patterns of non-college-bound students, by number of credits taken: 1983 and 1991

	Subsample percentage	Earnings		Weeks employed		Weeks unemployed		Weeks not in labor market	
		1983	1991	1983	1991	1983	1991	1983	1991
Total		$11,100	$17,800	34	41	4	5	14	6
Academic credits									
0–11	50.3	11,900	17,800	35	42	4	5	13	5
12–15	39.9	10,100	18,000	33	41	4	5	15	6
16–19	9.2	11,300	17,000	37	42	3	5	12	5
20 or more	—	—	—	—	—	—	—	—	—
Vocational credits									
0–3	23.5	10,700	17,000	33	41	5	5	14	6
4–8	53.9	11,000	18,000	34	41	4	5	14	5
9 or more	22.7	12,000	17,000	36	42	4	4	11	6

— Sample size is too small for a reliable estimate.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

Table 4—Labor market outcomes according to academic and specific labor market preparation achievement of non-college-bound students, by grade-point average (GPA): 1983 and 1991

	Subsample percentage	Earnings		Weeks employed		Weeks unemployed		Weeks not in labor market	
		1983	1991	1983	1991	1983	1991	1983	1991
GPA									
Mostly A's	5.1	14,500	14,900	35	36	2	4	15	12
Mostly B's	22.5	13,200	17,900	37	42	3	4	12	6
Mostly C's	60.6	10,700	18,300	35	42	4	5	13	5
Less than C's	11.9	700	16,300	25	38	6	6	20	7
Specific labor market preparation GPA									
Mostly A's	14.9	12,700	15,400	38	39	3	5	11	8
Mostly B's	27.2	13,700	19,300	37	43	3	4	12	5
Mostly C's	42.3	10,200	17,700	34	42	4	5	14	5
Less than C's	15.6	8,500	17,300	28	39	6	7	18	6

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

Work Experience

Most research indicates that students who work while in high school reap substantial rewards. Table 5 provides information that is consistent with these findings. Non-college-bound students who did not work in high school did relatively poorly in the labor market immediately upon graduation and 10 years later.[26] For example, in 1983, students who worked more than 22 hours per week in high school earned almost $3,000 more than those who worked less than 15 hours. In addition, the earnings gap between these two groups persisted in 1991.

Table 5—Labor market outcomes according to hours worked in high school by non-college-bound students: 1983 and 1991

	Subsample	Earnings		Weeks employed		Weeks unemployed		Weeks not in labor market	
	percentage	1983	1991	1983	1991	1983	1991	1983	1991
Hours worked									
None	26.6	$9,500	$16,100	31	40	7	4	14	7
1–14	27.4	9,900	16,200	34	42	5	3	13	6
15–21	19.6	12,400	17,800	38	42	2	4	12	6
22–29	11.0	12,700	22,800	39	47	2	2	11	2
30 or more	15.3	12,700	20,700	37	48	3	1	12	3
Co-op program									
Yes	6.7	11,700	15,100	34	43	4	3	14	6
No	93.3	11,100	18,000	35	43	4	3	13	6

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

There were many students from the 1980 HS&B sophomore cohort who chose not to go to college but who had good grades in high school and had good academic skills. In particular, 28 percent had at least a B average in high school, and 18 percent tested in the upper quartile in mathematics skills. This is important to keep in mind when considering the multivariate results that follow.

[26]The definition of work includes employment on weekdays and on weekends.

Multivariate Analysis

One of the difficulties in analyzing cross-tabular data is assessing the relative contribution of various student and course-taking characteristics to outcomes when the course-taking and student characteristic variables are highly correlated. A student's gender, race/ethnicity, family SES, and other factors in themselves can strongly influence his or her labor market experiences. Unless the interrelationships of these factors are properly controlled, the effect of high school curriculum, work experience, and academic achievement on labor market outcomes cannot be accurately measured.

Therefore, in this analysis, a multivariate model was developed to explore and explain the interrelationships between course taking, student characteristics, and outcomes (see the technical appendix for details of this analysis). The analysis uses earnings, weeks employed, weeks unemployed, and weeks not in the labor force as indicators of labor market success. These four dependent variables were regressed on the nine groups of independent variables representing high school academic and vocational curricula, work experience, and academic achievement mentioned in the data section, along with a set of control variables. These variables include student race/ethnicity, SES, and standardized test scores in mathematics. Each set of independent variables was assessed separately net of the control variables; that is, nine equations were run, each with a set of independent variables representing a factor (e.g., grades) along with the same set of control variables (e.g., success).[27]

For each dependent variable, the equations were estimated separately for males and females in 1983 and 1991. In addition, two sets of regressions were run: one controlled for student standardized mathematics test score; the other did not. This was done because of the fact that mathematics achievement was highly correlated with many of the other variables in the equation (e.g. academic course-taking). Running two sets of equations permitted the examination of the effect of all of the variables with and without the net effect of mathematics achievement. Tables that include the results of the regression analysis along with *change in R-squared, t-test,* and *F-test* statistics can be found in appendices A and B.

[27]A full model had originally been run with a simple equation representing all of the independent variables. This equation, however, suffered from a high degree of multicollinarity, and it was difficult to interpret the factors. The study, therefore, changed from the full model strategy in favor of the present analytical strategy.

Results

For most categories of the inputs identified as relevant to future job performance, there were far more nonsignificant results than significant ones, and the results were frequently mixed among the statistically significant ones.[28] Some findings, however, were suggestive and are addressed in the following section.

Personal and Family Characteristics

The SES, race/ethnicity, and test scores of the female non-college-bound graduates were more strongly related to the four labor market outcome measures in 1983 than they were for their male counterparts (tables A1 and A2). Without test scores, the control variables explained about 7 to 9 percent of the variance in labor market outcomes for females in 1983. The test score variables explained about an additional 2 percent of the variance, on average (tables B1 and B2). For males, the full set of control variables explained about 1–3 percent of the variance in earnings and employment status in 1983. However, by 1991, both male and female student background variables had a much smaller association with labor market experience. For women, they explained about 2 percent of the variance in earnings and less than 1 percent of the variance on other labor market outcomes. The control variables explained about 1–4 percent of the variance in labor market outcomes for men in 1991.

One of the most pronounced and consistent relationships in the data on student characteristics is between family SES and students' labor market outcomes immediately after graduation. For example, in this cohort, students from high-SES families were employed for more weeks and unemployed for fewer weeks, on average, in 1983 than were students from low-SES families. It may be that children of wealthier parents have different skills, values, or ambitions than those from poorer families. Or, possibly, wealthier parents reside in locations where their children can get better paying jobs. In addition, wealthier parents may have connections in the marketplace of jobs that are more direct than poorer families do.

[28] In the tables located in the appendices, bolded *F*-values indicate that the set of new variables explains a statistically significant amount of variance in the dependent variables for that equation. An asterisk (*) beside the coefficients suggests that the variable is statistically significant at a 95 percent level of confidence.

In 1983, among non-college-bound graduates, black females (but not males) consistently earned less, worked fewer weeks, and were more likely to be unemployed than the average graduate in the cohort. In fact, female black graduates earned about $3,000 less and worked 6 fewer weeks than did their peers.

The final set of relationships in the data on student characteristics worth noting is between students' test scores and labor market outcomes in 1983 (tables B1 through B4). The results for the test scores were generally the same as those for the SES quartile data. Male students with higher test scores in high school typically earned higher wages and had more stable patterns of employment than did those with lower test scores. By 1991, the effects of test scores on labor market outcomes disappeared. However, it is difficult to determine what this means because test scores summarize a complex set of relationships. For example, work by Meyer and Rasinski on the impact of course taking on test scores shows that scores are related to certain kinds of coursework.[29]

As shown later, including the test scores in the set of control variables changed few of the reported results for the other independent variables. Consequently, because test scores did not add much to the explanatory power of the equations and because of the complexity of the relationship of test scores to the other variables, the following discussion of the course taking and high school experiences of graduates are based on equations that use the set of control variables that do not include test scores—that is, the set of results in tables A1 through A4 rather than tables B1 through B4.

Effects of High School Curriculum

Male high school graduates had similar initial or long-term labor market experiences regardless of the educational track, specialization, or course-taking patterns they pursued during high school.[30] On the other hand, female graduates' high school specialization, educational track, and course-taking patterns had a weak but significant association with labor market outcomes, explaining an additional 2 to 4 percent of the variance in the four labor market outcomes variables in 1983. As with the demographic variables, the explanatory power of high school curriculum was short lived—and disappeared in 1991.

[29]Rob Meyer, *Applied Versus Traditional Mathematics: New Econometric Models of the Contribution of High School Courses to Mathematics Proficiency* (Madison: University of Wisconsin, 1992); Kenneth Rasinski, *High School Vocational Education: Does It Promote Learning?* (Chicago, IL: The National Opinion Research Center, 1994).

[30]Although some of the *F*-tests indicate significant joint effects, very few individual variables are significant.

Academic course taking was related to more favorable labor market outcomes for female graduates. Specifically, the labor market outcomes were related to their completing higher level mathematics classes. Females who earned credits in advanced mathematics worked 4–5 more weeks than the average female graduate of this cohort in 1983, and females who took geometry worked 4–5 more weeks than their peers in 1991.

Vocational course taking was either associated with poorer earnings and unemployment or resulted in nonsignificant coefficients. For example, one additional vocational credit earned by a female student was associated with a $900 decrease in 1983 earnings. Most other variables regarding vocational coursework, such as vocational concentration, vocational track, and specific occupational paths, were either nonsignificant or did not generate consistent results. The one exception was credits earned in SLMP courses: as the number of SLMP credits earned rose, so did the earnings and weeks employed for females in 1983. This may have occurred because female students who took these courses may have been more likely to enter jobs that matched their high school training. As mentioned previously, the literature suggests that vocational students benefit only if they find work in the fields in which they specialized.

Academic Achievement

A review of the grades suggests that greater scholastic ability was associated with early labor market success among non-college-bound high school graduates. Academic achievement, as measured by students' GPA in their academic and SLMP classes, was strongly related to earnings in 1983 for both male and female graduates, explaining an additional 4 percent in the variation for earnings. For example, females who did poorly in their courses in the SLMP curriculum earned about $3,000 less and were employed 5 fewer weeks than the average female graduate in this cohort. On the other hand, if females fared well (earning mostly B's) in their SLMP courses, they earned about $3,000 more than their female peers in 1983.

When standardized test scores in mathematics were included in the regression equations, the effects of grades on labor market outcomes for females diminished; however, grades remained strongly associated with labor market success for males. It appears as though the marketplace rewarded males who had good basic skills and positive work attitudes, represented by grades holding ability constant. It is worth noting that good grades may capture what is sometimes referred to as the "work ethic"; for instance, employers might believe that those who work harder in high school also work more in subsequent years.

Work Experience

As noted earlier, working during high school was prevalent among members of the non-college-bound cohort, and the findings indicate that the experience was beneficial to new graduates as they made a transition into the labor force. In addition, work experience in high school was positively associated with both early and later labor market success for female graduates, explaining an additional 2 to 4 percent of the variance in all four labor market outcome indicators. In 1983, female graduates who worked a moderate amount of time during high school (22 to 29 hours per week) worked almost 10 more weeks than the average female graduate in this cohort. In 1991, those same females enjoyed an advantage in the labor market over their female peers—earning over $4,000 more than the average graduate in the cohort. On the other hand, among male graduates, work experience did not have a consistent impact on their labor market outcomes in 1983 or 1991. It is interesting to note, however, that male graduates who worked 30 or more hours per week tended to enjoy greater labor market success than their male peers while those who worked 0 to 14 hours per week were less successful. The disparity between these two groups in 1983 was about $3,000. As mentioned previously, Meyer and Wise believe that it is possible that persons who work in high school in order to gain skills and other work-related attributes gain an advantage in the labor market after graduation because demand may be greater for these individuals than for those who do not work.[31]

Summary and Conclusions

In keeping with the literature, High School and Beyond data suggest that the non-college-bound population had poor high school and labor market experiences. Many, but not all of these students, earned lower grades, tested relatively poorly, and generally avoided rigorous curriculum. Moreover, the transition between high school and the work force was not smooth for them because the average non-college-bound student earned low wages and was not consistently employed in 1983. While the employment status of these former students stabilized by 1991, their earnings remained relatively low.

Controlling for personal characteristics, this study found that academic achievement and work experience while in high school were positively related to several measures of labor market success for non-college-bound students, although females appeared to benefit more than males. Students who either earned higher grades in SLMP and academic courses or who worked during high school tended to earn more and were employed more consistently than their peers. On the other hand, the associations between the labor market experiences and academic and vocational

[31]Meyer and Wise, "High School Preparation and Early Labor Force Experience," 307.

course taking of the non-college-bound population were generally not significant. In other words, what this group of students actually took in high school, after controlling for demographic characteristics, does not appear to matter.

Furthermore, because mathematics ability and course taking are correlated with one another, we introduced into the regression equations base year mathematics test scores. After so doing however, none of the findings changed dramatically. Some of the coefficients were no longer statistically significant in these fuller models, but the general size of the effects did not change.

However, it is important to keep in mind that the group of students examined in this report attended high school in the early 1980s, at a time preceding the rush of school reforms sparked by publications such as *A Nation at Risk*.[32] If these reforms have had their desired impact, the types and content of courses have changed over the last two decades. While vocational coursework in 1982 may not have led to more desirable outcomes in that year for non-college-bound youth, this does not mean that non-college-bound youth participating in an innovative vocational program in 1999 would have the same outcomes.

[32]National Commission on Excellence in Education, *A Nation at Risk: The Imperative for Educational Reform* (Washington, D.C.: 1983).

Appendix A—Regression Equations

Table A.1—Regression equations for 1983 labor market outcomes for female non-college-bound high school graduates

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Control variables	Intercept	26.9 *			6.7 *			18.3 *			9,575 *		
	Asian/Pacific Islander	5.1			-3.2			-1.9			(705)		
	Black, non-Hispanic	-5.6 *			6.1 *			-0.5			(3,037) *		
	Hispanic	1.3			-2.0			0.7			303		
	Amer. Indian/Alaskan Native	-4.8			2.2			2.6			(704)		
	Middle socioeconomic status	6.2 *			0.4			-6.6 *			(1,652)		
	High socioeconomic status	6.4 *			-2.4 *			-4.0			1,613		
	SES missing	-12.7 *			1.9			10.8 *			3,166		
			0.087	**7.55**		0.093	**8.15**		0.072	**6.15**		0.086	**7.61**
Course taking	Academic credits	0.1			0.6			-0.7			(983) *		
	Math credits	0.7			-0.8			0.2			640		
	SLMP[2] credits	2.1 *			-0.3			-1.9 *			470 *		
	English credits	-3.0 *			1.7 *			1.3			25		
	Vocational credits	-1.5 *			0.8 *			0.7			(926) *		
	Total credits	0.8			-0.7 *			-0.1			603 *		
			0.043	**4.49**		0.034	**3.51**		0.026	**2.64**	*	0.027	**2.79**
Work experience	Hours worked 0 to 14	2.4			1.0			-3.4			(1,153)		
	Hours worked 15 to 21	5.1 *			-1.9 *			-3.2			(2)		
	Hours worked 22 to 29	9.7 *			-2.3 *			-7.4 *			2,363		
	Hours worked 30 plus	3.1			0.1			-3.2			54		
	Hours worked missing	-20.7 *			1.3			19.5 *			(116)		
			0.039	**4.95**		0.032	**4.05**		0.025	**3.10**		0.015	1.78
Work experience with co-op program	Hours worked 0 to 14	2.5			0.9			-3.5			(1,135)		
	Hours worked 15 to 21	5.1 *			-1.9 *			-3.2			(11)		
	Hours worked 22 to 29	9.7 *			-2.3 *			-7.4 *			2,370		
	Hours worked 30 plus	3.0			0.2			-3.2			37		
	Hours worked missing	-20.7 *			1.2			19.5 *			(110)		
	Participated in co-op	2.1			-1.6 *			-0.5			358		
			0.040	**4.20**		0.034	**3.53**		0.025	**2.58**		0.015	1.49
Specialization	College prep	3.9 *			0.3			-4.3 *			(379)		
	Sampler	0.5			0.8			-1.3			(542)		
	Limited concentrator	-4.5			-0.4			4.9			(616)		
	Vocational concentrator	8.0			-4.2 *			-3.8			100		
			0.011	1.65		0.005	0.70		0.011	1.63		0.000	0.02

Table A.1—Regression equations for 1983 labor market outcomes for female non-college-bound high school graduates—Continued

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings 1983 coefficient	Change in R squared	F value
Program area	Academic track	-2.6 *			0.4			2.2			(1,466) *		
	Vocational track	1.7			0.2			-1.9			894		
	Both	3.8 *			-0.6			-3.1 *			(295)		
			0.012	2.44		0.002	0.49		0.016	**3.31**	*	0.007	1.34
Vocational concentration	Agriculture	5.2			3.0			-8.3			(3,559)		
	Business	4.7			2.3			-7.1			(2,077)		
	Marketing	11.4			-2.1			-9.3			(1,391)		
	Health	-6.3			10.6			-4.4			355		
	Occupational health	7.8			3.1			-10.9			(362)		
	Trade and industry	10.3			2.4			-12.7 *			(4,629)		
	Technology	-33.7			-22.2			56.1			14,547		
			0.023	2.02		0.037	**3.28**		0.025	**2.16**		0.007	0.63
Advanced English and mathematics	Taken advanced English	1.1			-2.4			1.3			(114)		
	Taken Algebra 1	0.4			-0.3			-0.1			(925)		
	Taken geometry	0.7			-1.8 *			1.1			1,937		
	Taken other advanced math	5.1 *			0.3			-5.3 *			(68)		
			0.036	**5.72**		0.016	**2.39**		0.030	**4.52**		0.011	1.76
Academic grades	Grades mostly A	1.7			-1.2			-0.5			2,528		
	Mostly B	3.8 *			0.2			-4.0 *			1,373		
	Mostly C	-7.9 *			0.6			7.2 *			(3,344) *		
			0.018	**3.60**	0.0 2	0.007	1.50		0.001	2.14		0.018	**3.62**
Academic and vocational grades	Grades mostly A	0.0			-0.7			0.8			2,102 *		
	Mostly B	2.7			1.1			-3.8 *			298		
	Mostly C	-5.4 *			-0.7			6.1 *			(1,848)		
	SLMP[2] grade mostly A	2.5			-0.4			-2.1			343		
	SLMP[2] mostly B	2.5			-2.8 *			0.4			3,093 *		
	SLMP[2] mostly C	-5.3 *			2.4			2.9			(3,071) *		
	SLMP[2] missing	-0.4			0.8			-0.4			(356)		
			0.03	**2.64**		0.028	**2.47**		0.019	1.64	*	0.048	**4.31**

[1]NILF indicates not in the labor force. *

[2]SLMP indicates specific labor market preparation.

NOTE: An asterisk beside the coefficient indicates that the variable is statistically significant at a 95 percent level of confidence; a bolded F-value indicates that the set of new variables explains a statistically significant amount of variance in the dependent variable for that equation. Numbers in parentheses are negative.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

Table A.2—Regression equations for 1983 labor market outcomes for male non-college-bound high school graduates

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Control variables	Intercept	32.7 *			3.6 *			15.8 *			11,396 *		
	Asian/Pacific Islander	-1.7			-1.1			2.8			954		
	Black, non-Hispanic	-0.8			1.8			-1.0			(1,472)		
	Hispanic	1.6			-0.8			-0.8			896		
	Amer. Indian/Alaskan Native	-3.8			0.7			3.1			(1,740)		
	Middle socioeconomic status	2.8			-0.3			-2.5			(116)		
	High socioeconomic status	1.7			-2.3 *			0.6			2,729 *		
	SES missing	-2.9			1.3			1.7			(663)		
			0.016	1.70		0.019	2.00		0.011	1.11		0.032	**3.48**
Course taking	Academic credits	-0.4			0.4			0.1			(245)		
	Math credits	0.3			-0.4			0.1			(235)		
	SLMP[2] credits	0.3			0.5			-0.8			108 *		
	English credits	-1.2			-0.1			1.3			(514)		
	Vocational credits	-0.4			-0.1			0.5			(332)		
	Total credits	1.2			-0.5			-0.7			335		
			0.039	**4.96**		0.022	**2.69**		0.03	**3.67**	*	0.008	1.02
Work experience	Hours worked 0 to 14	-1.8			0.4			1.4			(1,565) *		
	Hours worked 15 to 21	2.6			-0.8			-1.8			1,392		
	Hours worked 22 to 29	0.4			-1.3			0.9			351		
	Hours worked 30 plus	1.3			-0.6			-0.6			1,519 *		
	Hours worked missing	2.1			-0.5			-1.7			(24)		
			0.006	0.92		0.018	**2.65**		0.004	0.57		0.017	**2.49**
Work experience with co-op program	Hours worked 0 to 14	-1.9			0.4			1.5			(1,555) *		
	Hours worked 15 to 21	2.7			-0.8			-1.9			1,386		
	Hours worked 22 to 29	0.4			-1.3			0.9			345		
	Hours worked 30 plus	1.4			-0.6			-0.7			1,512 *		
	Hours worked missing	2.1			-0.5			-1.7			(26)		
	Participated in co-op	-1.6			-0.2			1.8			160		
			0.009	1.08		0.018	**2.23**		0.008	0.92		0.017	2.08
Specialization	College prep	0.3			-0.3			0.0			927		
	Sampler	-4.9			0.9			4.0			127		
	Limited concentrator	-0.8			-0.9			1.7			405		
	Vocational concentrator	-2.6			-2.1			4.7			2,225		
			0.024	**4.54**		0.01	1.83		0.022	4.03		0.006	1.03

Table A.2—Regression equations for 1983 labor market outcomes for male non-college-bound high school graduates—Continued

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Program area	Academic track	-2.7			-0.7			3.4 *			(479)		
	Vocational track	0.3			0.1			-0.3			134		
	Both	1.7			-0.2			-1.6			(437)		
			0.01	2.41		0.005	1.25		0.017	**4.09**	*	0.004	1.04
Vocational concentration	Agriculture	1.6			-0.8			-0.8			1,379		
	Business	-5.6			-1.2			6.7			(1,905)		
	Marketing	-1.5			-1.7			3.2			2,978		
	Health	10.6			1.0			-11.5			(6,392)		
	Occupational health	3.4			4.1			-7.5			2,414		
	Trade and industry	0.9			1.2			-2.0			(297)		
	Technology	-7.9			-3.3			11.2			1,639		
			0.012	1.23		0.003	0.33		0.016	1.66		0.009	0.95
Advanced English and mathematics	Taken advanced English	-0.1			0.3			-0.2			1,121		
	Taken Algebra 1	0.0			-0.1			0.0			533		
	Taken geometry	3.2			-0.4			-2.8			347		
	Taken other advanced math	-0.6			0.3			0.3			48		
			0.016	**3.00**		0.006	1.18		0.016	**2.86**		0.007	1.39
Academic grades	Grades mostly A	3.4			-1.9 *			-1.5			2,076		
	Mostly B	3.7 *			-1.3 *			-2.4			1,689 *		
	Mostly C	-7.1			2.3			4.8			(2,721)		
			0.027	**6.73**		0.021	**5.30**		0.012	**3.01**		0.026	**6.54**
Academic and vocational grades	Grades mostly A	0.8			-2.0 *			1.2			2,238 *		
	Mostly B	2.4			-1.6 *			-0.8			1,389 *		
	Mostly C	-4.4			2.6 *			1.8			(2,685) *		
	SLMP[2] grade mostly A	3.9			0.6			-4.5 *			(150)		
	SLMP[2] mostly B	2.0			1.0			-3.0 *			1,394 *		
	SLMP[2] mostly C	-3.4			0.1			3.3			651		
	SLMP[2] missing	-0.9			-1.5			2.4			(1,168)		
			0.036	**3.92**		0.029	**3.10**		0.026	**2.73**	*	0.037	**4.04**
											*		

[1]NILF indicates not in the labor force.

[2]SLMP indicates specific labor market preparation.

NOTE: An asterisk beside the coefficient indicates that the variable is statistically significant at a 95 percent level of confidence; a bolded F-value indicates that the set of new variables explains a statistically significant amount of variance in the dependent variable for that equation. Numbers in parentheses are negative.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

Table A.3—Regression equations for 1991 labor market outcomes for female non-college-bound high school graduates

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Control variables	Intercept	37.6 *			7.8 *			6.6 *			12,557 *		
	Asian/Pacific Islander	3.6			1.3			-4.8 *			(435)		
	Black, non-Hispanic	-1.0			-0.7			1.6			1,090		
	Hispanic	-1.3			0.4			0.9			(657)		
	Amer. Indian/Alaskan Native	0.9			1.9			-2.8			(278)		
	Middle socioeconomic status	3.1			-0.9			-2.3			(137)		
	High socioeconomic status	-0.9			-1.5			2.4			3,630 *		
	SES missing	-2.7			2.9			-0.2			(2,154)		
			0.005	0.41		0.005	0.41		0.011	0.89		0.024	0.19
Course taking	Academic credits	0.3			0.6			-0.8			(606)		
	Math credits	0.3			-2.3 *			2.1			(445)		
	SLMP[2] credits	0.1			0.8			-0.9			246 *		
	English credits	-0.3			0.9			-0.6			(313)		
	Vocational credits	0.2			-0.4			0.2			(804)		
	Total credits	0.0			-0.4			0.4			657		
			0.002	0.19		0.004	0.39		0.027	**2.55**	*	0.010	0.93
Work experience	Hours worked 0 to 14	0.3			-1.2			0.9			(1,483)		
	Hours worked 15 to 21	-3.0			0.8			2.2			(896)		
	Hours worked 22 to 29	5.2 *			-1.3			-3.9			4,101 *		
	Hours worked 30 plus	6.1 *			-2.6 *			-3.5			463		
	Hours worked missing	-6.1			4.8 *			1.3			(2,697)		
			0.007	0.76		0.003	0.38		0.003	0.31		0.023	**2.71**
Work experience with co-op program	Hours worked 0 to 14	0.6			-1.3			0.7			(1,442)		
	Hours worked 15 to 21	-3.0			0.8			2.2			(909)		
	Hours worked 22 to 29	5.2			-1.3			-3.9			4,113 *		
	Hours worked 30 plus	5.8 *			-2.5			-3.4			439		
	Hours worked missing	-6.0			4.8 *			1.2			(2,715)		
	Participated in co-op	4.9 *			-1.4			-3.6 *			662		
			0.016	1.52		0.004	0.37		0.008	0.75		0.025	**2.41**
Specialization	College prep	2.2			0.4			-2.6			919		
	Sampler	-0.7			0.6			0.1			1,426		
	Limited concentrator	0.6			-1.8			1.2			(1,777)		
	Vocational concentrator	-6.2			-1.8			8.0			(2,988)		
			0.003	0.44		0.004	0.54		0.007	1.03		0.010	1.39

Table A.3—Regression equations for 1991 labor market outcomes for female non-college-bound high school graduates—Continued

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Program area	Academic track	1.0			-1.0			0.0			(105)		
	Vocational track	3.5 *			-1.7			-1.8			651		
	Both	-2.5			2.4			0.2			(160)		
			0.012	2.32		0.002	0.31		0.012	2.21	*	0.005	0.88
Vocational concentration	Agriculture	-1.8			1.7			0.1			3,652		
	Business	-5.5			0.0			5.5			(2,857)		
	Marketing	-10.6			-1.1			11.7			(4,953)		
	Health	-6.0			4.8			1.2			(3,259)		
	Occupational health	-8.0			2.7			5.3			(961)		
	Trade and industry	-5.1			-5.1			10.2			(1,574)		
	Technology	44.6			-2.9			-41.8			13,084		
			0.009	0.75		0.004	0.31		0.006	0.45		0.024	2.00
Advanced English and mathematics	Taken advanced English	-2.1			-0.9			3.0			(2,500)		
	Taken Algebra 1	-1.1			1.0			0.2			(315)		
	Taken geometry	5.0 *			-1.5			-3.5 *			1,053		
	Taken other advanced math	-2.0			-0.9			2.9			573		
			0.006	0.86		0.005	0.68		0.014	1.91		0.006	0.83
Academic grades	Grades mostly A	-2.7			-1.4			4.1			(450)		
	Mostly B	3.1			-0.1			-3.0			907		
	Mostly C	-4.3			1.6			2.6			(1,701)		
			0.020	**3.78**		0.006	1.15		0.028	**5.40**		0.004	0.73
Academic and vocational grades	Grades mostly A	-1.1			-2.6			3.7			1,366 *		
	Mostly B	2.6			-0.1			-2.5			739		
	Mostly C	-4.2			2.1			2.1			(2,606)		
	SLMP[2] grade mostly A	-2.7			1.9			0.8			(3,005) *		
	SLMP[2] mostly B	1.0			0.0			-1.0			646		
	SLMP[2] mostly C	-3.2			0.9			2.4			331		
	SLMP[2] missing	2.9			-1.9			-1.0			1,883		
			0.030	**2.46**		0.014	1.09		0.032	**2.60**	*	0.018	1.47

[1]NILF indicates not in the labor force. *

[2]SLMP indicates specific labor market preparation.

NOTE: An asterisk beside the coefficient indicates that the variable is statistically significant at a 95 percent level of confidence; a bolded F-value indicates that the set of new variables explains a statistically significant amount of variance in the dependent variable for that equation. Numbers in parentheses are negative.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

Table A.4—Regression equations for 1991 labor market outcomes for male non-college-bound high school graduates

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Control variables	Intercept	47.4 *			2.9 *			1.7 *			22,377 *		
	Asian/Pacific Islander	0.4			0.2			-0.6			3,794		
	Black, non-Hispanic	-0.7			-0.7			1.4			(2,705)		
	Hispanic	1.4			-1.3			-0.1			793		
	Amer. Indian/Alaskan Native	-3.3			3.1			0.2			(3,912)		
	Middle socioeconomic status	-0.4			-0.5			0.9			(647)		
	High socioeconomic status	1.6 *			-0.6			-1.0 *			2,500		
	SES missing	0.1			0.3			-0.4			543		
			0.037	3.94		0.016	1.68		0.014	1.49		0.034	**3.66**
Course taking	Academic credits	-0.2			0.3			-0.1			(714)		
	Math credits	0.1			0.3			-0.4			204		
	SLMP[2] credits	-0.4			0.2			0.3			(305) *		
	English credits	0.4			-0.2			-0.2			1,236		
	Vocational credits	0.1			0.1			-0.2			(377)		
	Total credits	-0.1			-0.1			0.1			625		
			0.014	1.77	0	0.018	**2.22**		0.018	**2.19**	*	0.017	**2.19**
Work experience	Hours worked 0 to 14	-1.7			1.0			0.6			(792)		
	Hours worked 15 to 21	-0.2			-0.2			0.4			243		
	Hours worked 22 to 29	-0.2			0.2			0.0			2,141		
	Hours worked 30 plus	0.4			-0.7			0.3			906		
	Hours worked missing	2.7			-2.1			-0.6			(507)		
			0.004	0.66	2.3	0.017	**2.48**		0.008	1.19		0.009	1.39
Work experience with co-op program	Hours worked 0 to 14	-1.6			1.0			0.6			(836)		
	Hours worked 15 to 21	-0.2			-0.2			0.4			268		
	Hours worked 22 to 29	-0.2			0.2			0.0			2,154		
	Hours worked 30 plus	0.3			-0.6			0.3			936		
	Hours worked missing	2.7 *			-2.1			-0.6			(496)		
	Participated in co-op	1.3			-0.5			-0.8			(626)		
			0.005	0.63		0.017	**2.11**		0.010	1.23		0.010	1.18
Specialization	College prep	-1.1			0.7			0.4			(1,038)		
	Sampler	-2.0			0.0			1.9			(1,732)		
	Limited concentrator	2.5			0.4			-2.9 *			1,633		
	Vocational concentrator	1.2			-1.1			-0.1			225		
			0.004	0.84		0.007	1.20		0.003	0.52		0.006	1.56

Table A.4—Regression equations for 1991 labor market outcomes for male non-college-bound high school graduates—Continued

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Program area	Academic track	-0.2			-0.1			0.3			362		
	Vocational track	-0.5			-0.2			0.7			(788)		
	Both	-0.1			0.7			-0.6			250		
			0.005	1.20		0.015	**3.78**		0.002	0.57	*	0.004	0.89
Vocational concentration	Agriculture	0.3			0.1			-0.4			(1,675)		
	Business	4.6			-2.3			-2.2			3,579		
	Marketing	4.2			-1.8			-2.4			3,345		
	Health	-22.9			8.7			14.2			(11,982)		
	Occupational health	4.2 *			-1.7			-2.5			3,823		
	Trade and industry	1.6			0.1			-1.8			(605)		
	Technology	5.7			-2.7			-3.1			3,212		
			0.003	0.27		0.012	1.28		0.005	0.52		0.008	0.81
Advanced English and mathematics	Taken advanced English	1.6			0.2			-1.8 *			3,039		
	Taken Algebra 1	1.1			-0.3			-0.8			1,026		
	Taken geometry	0.1			-0.3			0.2			(641)		
	Taken other advanced math	0.0			0.1			-0.1			1,001		
			0.012	2.29		0.005	0.88		0.007	1.20		0.010	1.92
Academic grades	Grades mostly A	1.0			0.2			-1.3 *			1,245		
	Mostly B	0.9			-0.6			-0.3			1,791		
	Mostly C	-1.5			0.1			1.4			(2,330)		
			0.003	0.84		0.003	0.73		0.006	1.49		0.008	2.03
Academic and vocational grades	Grades mostly A	1.4			0.0			-1.5 *			2,307 *		
	Mostly B	1.0			-0.6			-0.4			1,659		
	Mostly C	-2.0			0.3			1.7			(2,799) *		
	SLMP[2] grade mostly A	-0.9			0.6			0.3			(2,214)		
	SLMP[2] mostly B	0.4			-0.1			-0.2			1,016		
	SLMP[2] mostly C	1.1			-0.4			-0.7			165		
	SLMP[2] missing	0.4			-0.7			0.3			1,270		
			0.006	0.60		0.009	0.93		0.016	1.67	*	0.015	1.62

[1]NILF indicates not in the labor force. *

[2]SLMP indicates specific labor market preparation.

NOTE: An asterisk beside the coefficient indicates that the variable is statistically significant at a 95 percent level of confidence; a bolded F-value indicates that the set of new variables explains a statistically significant amount of variance in the dependent variable for that equation. Numbers in parentheses are negative.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

Appendix B—Regression Equations, Controlling for Standardized Test Scores in Mathematics

Table B.1—Regression equations for 1983 labor market outcomes for female non-college-bound high school graduates, controlling for test scores

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Control variables	Intercept	7.9			8.1 *			36.0 *			9,043 *		
	Asian/Pacific Islander	4.7			-3.1			-1.6			(1,189)		
	Black, non-Hispanic	-4.6			6.0 *			-1.4			(3,505) *		
	Hispanic	2.3			-2.1			-0.2			620		
	Amer. Indian/Alaskan Native	-5.1			2.3			2.9			445		
	Middle socioeconomic status	5.6 *			0.5			-6.0 *			(1,801)		
	High socioeconomic status	5.8 *			-2.3 *			-3.5			1,549		
	SES missing	-12.4 *			1.9			10.5 *			3,324		
	Base year math score	0.5 *			0.0			-0.4 *			41		
	Missing on math score	-5.3			0.6			4.6			(3,320)		
			0.110	**7.62**		0.098	**6.69**		0.093	**6.31**		0.093	**6.40**
Course taking	Academic credits	0.0			0.6			-0.6			(1,118) *		
	Math credits	0.4			-0.9			0.5			730		
	SLMP[2] credits	2.0 *			-0.3			-1.7 *			509		
	English credits	-2.8 *			1.8 *			1.1			347		
	Vocational credits	-1.5			0.8 *			0.7			(1,052) *		
	Total credits	0.8			-0.7 *			-0.1			711 *		
			0.041	**4.39**		0.038	**4.03**		0.023	**2.42**		0.027	**2.86**
Work experience	Hours worked 0 to 14	2.8			1.0			-3.8 *			(1,230)		
	Hours worked 15 to 21	4.4 *			-1.9 *			-2.6			(40)		
	Hours worked 22 to 29	10.1 *			-2.4 *			-7.8 *			2,434		
	Hours worked 30 plus	3.5			0.1			-3.6			656		
	Hours worked missing	-21.4 *			1.3			20.1 *			(530)		
			0.043	5.54		0.033	**4.14**		0.029	3.63		0.013	1.63
Work experience with co-op program	Hours worked 0 to 14	2.9			0.9			-3.8 *			(1,226)		
	Hours worked 15 to 21	4.4 *			-1.8 *			-2.5			-43.56		
	Hours worked 22 to 29	10.1 *			-2.4 *			-7.8 *			2,432		
	Hours worked 30 plus	3.4			0.2			-3.6			656		
	Hours worked missing	-21.3 *			1.3			20.1 *			(530)		
	Participated in co-op	2.2			-1.6 *			-0.6			56		
			0.044	**4.78**		0.034	**3.60**		0.029	**3.06**		0.013	1.37
Specialization	College prep	3.4			0.4			-3.8 *			(363)		
	Sampler	-1.2			1.0			0.2			(589)		
	Limited concentrator	-2.5			-0.6			3.1			(398)		
	Vocational concentrator	8.0			-4.2 *			-3.7			(64)		
			0.009	1.42		0.005	0.71		0.009	1.39		0.000	0.02

Table B.1—Regression equations for 1983 labor market outcomes for female non-college-bound high school graduates, controlling for test scores —Continued

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Program area	Academic track	-2.8 *			0.4			2.4			(1,360) *		
	Vocational track	1.8			0.2			-2.1			948		
	Both	3.4 *			-0.6			-2.8			(417)		
			0.012	**2.55**		0.003	0.61		0.017	**3.44**		0.006	1.29
Vocational concentration	Agriculture	7.5			2.9			-10.5			(2,762)		
	Business	5.7			2.3			-8.0			(2,212)		
	Marketing	12.5			-2.2			-10.3			(1,276)		
	Health	-3.0			10.4			-7.5			1,394		
	Occupational health	10.1			3.0			-13.1 *			1,602		
	Trade and industry	11.9			2.3			-14.2 *			(4,122)		
	Technology	-46.8			-21.5			68.5			9,937		
			0.024	**2.15**		0.035	3.13		0.029	**2.58**		0.007	0.64
Advanced English and mathematics	Taken advanced English	0.3			-2.4			2.2			(154)		
	Taken Algebra 1	0.4			-0.3			-0.1			(1,174)		
	Taken geometry	0.4			-1.9 *			1.5			2,007		
	Taken other advanced math	4.2 *			0.2			-4.4 *			(305)		
			0.022	**3.53**		0.018	**2.74**		0.018	**2.84**		0.012	1.89
Academic grades	Grades mostly A	-0.6			-1.0			1.6			2,015		
	Mostly B	3.2 *			0.2			-3.4 *			1,449		
	Mostly C	-6.1 *			0.5			5.6 *			(2,657) *		
			0.013	**2.74**		0.007	1.37		0.008	1.67		0.016	**3.26**
Academic and vocational grades	Grades mostly A	-1.7			-0.6			2.4			1,700		
	Mostly B	2.2			1.2			-3.3 *			388		
	Mostly C	-4.0			-0.8			4.7			(1,274)		
	SLMP[2] grade mostly A	1.9			-0.4			-1.5			249		
	SLMP[2] mostly B	2.6			-2.8 *			0.3			3,418 *		
	SLMP[2] mostly C	-4.6			2.4			2.2			(3,046) *		
	SLMP[2] missing	-1.0			0.9			0.1			(734)		
			0.026	**5.37**		0.027	**2.40**		0.015	1.32		0.046	**4.14**

[1]NILF indicates not in the labor force.

[2]SLMP indicates specific labor market preparation.

NOTE: An asterisk beside the coefficient indicates that the variable is statistically significant at a 95 percent level of confidence; a bolded F-value indicates that the set of new variables explains a statistically significant amount of variance in the dependent variable for that equation. Numbers in parentheses are negative.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

Table B.2—Regression equations for 1983 labor market outcomes for male non-college bound high school graduates, controlling for test scores

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Control variables	Intercept	22.2 *			3.4			26.3 *			8,167 *		
	Asian/Pacific Islander	-2.2			-1.1			3.4			1,270		
	Black, non-Hispanic	0.1			1.8			-1.9			(1,256)		
	Hispanic	1.7			-0.8			-0.9			677		
	Amer. Indian/Alaskan Native	-3.4			0.7			2.7			(1,523)		
	Middle socioeconomic status	2.8			-0.3			-2.5			(397)		
	High socioeconomic status	1.4			-2.4 *			1.0			1,803		
	SES missing	-2.6			1.3			1.3			57		
	Base year math score	0.3 *			0.0			-0.3 *			94 *		
	Missing on math score	-1.7			0.7			1.0			324		
			0.03	**2.10**		0.018	1.49		0.024	**1.96**		0.041	**3.37**
Course taking	Academic credits	-0.6			0.4			0.2			(234) *		
	Math credits	0.3			-0.4			0.1			(351)		
	SLMP[2] credits	0.3			0.4			-0.7			117		
	English credits	-0.9			-0.1			0.9			(531)		
	Vocational credits	-0.3			-0.1			0.4			(279) *		
	Total credits	1.2			-0.5			-0.7			306 *		
			0.034	**4.29**		0.021	**2.58**		0.026	**3.18**		0.007	0.879
Work experience	Hours worked 0 to 14	-1.9			0.5			1.4			(1,571) *		
	Hours worked 15 to 21	2.4			-0.8			-1.6			807		
	Hours worked 22 to 29	0.1			-1.3			1.2			(431)		
	Hours worked 30 plus	1.6			-0.6			-1.0			805		
	Hours worked missing	2.4			-0.6			-1.8			2,248		
			0.006	0.939		0.017	**2.59**		0.004	0.654		0.018	**2.67**
Work experience with co-op program	Hours worked 0 to 14	-2.0			0.5			1.5			(1,579) *		
	Hours worked 15 to 21	2.4			-0.8			-1.7			816		
	Hours worked 22 to 29	0.2			-1.3			1.1			(425)		
	Hours worked 30 plus	1.6			-0.6			-1.0			809		
	Hours worked missing	2.4			-0.6			-1.8			2,245		
	Participated in co-op	-1.5			-0.2			1.6			(146)		
			0.009	1.05		0.018	**2.18**		0.008	0.949		0.018	**2.22**
Specialization	College prep	0.1			-0.3			0.2			632		
	Sampler	-5.5 *			0.9			4.5 *			(405)		
	Limited concentrator	-0.3			-0.9			1.2			1,484		
	Vocational concentrator	-2.7			-2.2			4.9			2,028		
			0.026	**4.87**		0.011	1.95		0.023	**4.24**		0.006	1.14

Table B.2—Regression equations for 1983 labor market outcomes for male non-college bound high school graduates, controlling for test scores —Continued

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Program area	Academic track	-3.0			-0.7			3.7 *			(787) *		
	Vocational track	0.6			0.1			-0.7			89		
	Both	1.7			-0.2			-1.5			(321)		
			0.011	**2.72**		0.005	1.18		0.018	**4.49**		0.005	1.18
Vocational concentration	Agriculture	1.7			-0.7			-1.0			2,533		
	Business	-4.4			-1.2			5.6			(867)		
	Marketing	-1.5			-1.6			3.1			3,328		
	Health	7.2			0.9			-8.0			(11,152)		
	Occupational health	5.2			3.8			-9.0			2,741		
	Trade and industry	0.9			1.3			-2.1			627		
	Technology	-7.2			-3.1			10.4			1,725		
			0.013	1.35		0.004	0.389		0.017	1.74		0.009	0.992
Advanced English and mathematics	Taken advanced English	-0.1			0.3			-0.2			914		
	Taken Algebra 1	0.2			-0.1			-0.1			898		
	Taken geometry	2.7			-0.4			-2.3			3		
	Taken other advanced math	-1.1			0.3			0.9			(469)		
			0.012	2.31		0.006	1.15		0.011	2.06		0.005	0.99
Academic grades	Grades mostly A	2.5			-2.0 *			-0.5			2,996 *		
	Mostly B	3.7 *			-1.3 *			-2.3			1,118		
	Mostly C	-6.6			2.4			4.1			(2,834) *		
			0.023	**5.87**		0.021	**5.28**		0.01	2.42		0.021	**5.41**
Academic and vocational grades	Grades mostly A	0.3			-2.1 *			1.8			3,153 *		
	Mostly B	2.4			-1.6 *			-0.8			895		
	Mostly C	-4.1			2.7 *			1.4			(2,889) *		
	SLMP[2] grade mostly A	3.7			0.5			-4.2 *			(36)		
	SLMP[2] mostly B	2.0			0.9			-2.9 *			1,035 *		
	SLMP[2] mostly C	-3.2			0.1			3.1			917 *		
	SLMP[2] missing	-1.1			-1.5			2.5			(1,241)		
			0.032	**3.39**		0.03	**3.19**		0.022	**2.31**		0.032	**3.52**

[1]NILF indicates not in the labor force.

[2]SLMP indicates specific labor market preparation.

NOTE: An asterisk beside the coefficient indicates that the variable is statistically significant at a 95 percent level of confidence; a bolded F-value indicates that the set of new variables explains a statistically significant amount of variance in the dependent variable for that equation. Numbers in parentheses are negative.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

Table B.3—Regression equations for 1991 labor market outcomes for female non-college-bound high school graduates, controlling for test scores

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Control variables	Intercept	30.3 *			10.3 *			11.4 *			8,387 *		
	Asian/Pacific Islander	3.8			1.5			-5.2 *			(945)		
	Black, non-Hispanic	-0.6			-0.8			1.4			713		
	Hispanic	-1.1			0.1			1.0			(63)		
	Amer. Indian/Alaskan Native	0.6			1.9			-2.5			94		
	Middle socioeconomic status	3.0			-0.8			-2.2			(832)		
	High socioeconomic status	-1.1			-1.5			2.6			4,075 *		
	SES missing	-2.7			2.8			-0.2			(1,590)		
	Base year math score	0.2			-0.1			-0.1			110		
	Missing on math score	0.6			2.1			-2.7			(2,885)		
			0.006	0.35		0.005	0.33		0.014	0.84		0.031	**2.01**
Course taking	Academic credits	0.2			0.6			-0.8			(651) *		
	Math credits	0.1			-2.3 *			2.3			(217)		
	SLMP[2] credits	0.1			0.8			-0.8			209		
	English credits	-0.1			0.9			-0.8			(418)		
	Vocational credits	0.2			-0.4			0.1			(872) *		
	Total credits	0.0			-0.4			0.4			713 *		
			0.002	0.19		0.004	0.39		0.027	**2.55**		0.009	0.88
Work experience	Hours worked 0 to 14	0.3			-1.3			1.0			(773)		
	Hours worked 15 to 21	-3.2			0.9			2.3			(949)		
	Hours worked 22 to 29	5.5 *			-1.4			-4.1			5,416 *		
	Hours worked 30 plus	6.2 *			-2.8 *			-3.4			933		
	Hours worked missing	-6.2			5.1 *			1.2			(5,700)		
			0.007	0.74		0.004	0.39		0.003	0.29		0.024	**2.84**
Work experience with co-op program	Hours worked 0 to 14	0.6			-1.4			0.8			(666)		
	Hours worked 15 to 21	-3.3			1.0			2.4			(1,032)		
	Hours worked 22 to 29	5.5 *			-1.4			-4.1			5,420 *		
	Hours worked 30 plus	5.9 *			-2.7 *			-3.2			961		
	Hours worked missing	-6.1			5.0 *			1.1			(5,778)		
	Participated in co-op	4.9 *			-1.4			-3.6 *			1,164		
			0.016	1.52		0.004	0.38		0.007	0.69		0.027	**2.59**
Specialization	College prep	2.0			0.6			-2.6			1,151		
	Sampler	-1.4			1.0			0.4			1,715		
	Limited concentrator	1.4			-2.2			0.8			(1,632)		
	Vocational concentrator	-6.3			-1.8			8.1			(2,929)		
			0.003	0.47		0.004	0.54		0.009	1.23		0.008	1.09

Table B.3—Regression equations for 1991 labor market outcomes for female non-college-bound high school graduates, controlling for test scores —*Continued*

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Program area	Academic track	0.9			-1.0			0.1			600 *		
	Vocational track	3.6 *			-1.8			-1.9			900		
	Both	-2.7			2.4			0.3			(689)		
			0.013	2.36		0.002	0.30		0.012	2.26		0.004	0.85
Vocational concentration	Agriculture	-1.1			1.4			-0.3			9,071		
	Business	-5.4			-0.2			5.7			(3,250)		
	Marketing	-10.5			-1.4			12.0			(4,500)		
	Health	-5.2			4.2			1.1			(5,093)		
	Occupational health	-7.4			2.3			5.1			345		
	Trade and industry	-5.1			-5.6			10.7			(586)		
	Technology	42.2			-0.3			-42.0			6,805		
			0.01	0.76		0.004	0.31		0.005	0.43		0.025	**2.06**
Advanced English and mathematics	Taken advanced English	-2.2			-0.8			3.0			(2,421)		
	Taken Algebra 1	-1.1			1.0			0.1			(994)		
	Taken geometry	4.7 *			-1.6			-3.1			795		
	Taken other advanced math	-2.4			-0.8			3.2			561		
			0.006	0.85		0.005	0.69		0.012	1.63		0.004	0.57
Academic grades	Grades mostly A	-3.6			-1.1			4.7			(837)		
	Mostly B	2.8			-0.1			-2.8			796		
	Mostly C	-3.6			1.4			2.1			(987) *		
			0.02	**3.77**		0.006	1.17		0.027	**5.12**		0.005	0.90
Academic and vocational grades	Grades mostly A	-1.8			-2.3			4.1			904		
	Mostly B	2.3			0.0			-2.4			565		
	Mostly C	-3.7			1.9			1.8			(1,684)		
	SLMP[2] grade mostly A	-3.0			2.0			1.1			(2,991) *		
	SLMP[2] mostly B	0.9			0.0			-0.9			924 *		
	SLMP[2] mostly C	-2.8			0.8			2.1			(222) *		
	SLMP[2] missing	2.9			-1.8			-1.1			1,804		
			0.031	**2.47**		0.014	1.09		0.031	**2.50**		0.019	1.59

[1]NILF indicates not in the labor force.

[2]SLMP indicates specific labor market preparation.

NOTE: An asterisk beside the coefficient indicates that the variable is statistically significant at a 95 percent level of confidence; a bolded F-value indicates that the set of new variables explains a statistically significant amount of variance in the dependent variable for that equation. Numbers in parentheses are negative.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

Table B.4—Regression equations for 1991 labor market outcomes for male non-college-bound high school graduates, controlling for test scores

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Control variables	Intercept	48.4 *			2.7			0.9			19,528 *		
	Asian/Pacific Islander	0.5			0.2			-0.6			4,564		
	Black, non-Hispanic	-0.7			-0.7			1.4			(2,225)		
	Hispanic	1.5			-1.4			-0.1			486		
	Amer. Indian/Alaskan Native	-3.3			3.1			0.3			(4,304)		
	Middle socioeconomic status	-0.4			-0.5			0.9			(1,010)		
	High socioeconomic status	1.8 *			-0.7			-1.1 *			1,362		
	SES missing	0.0			0.4			-0.4			1,292		
	Base year math score	0.0			0.0			0.0			81		
	Missing on math score	-1.9			1.1			0.8			2,706		
			0.038	**3.14**		0.015	1.20		0.016	1.32		0.041	**3.43**
Course taking	Academic credits	-0.2			0.3			-0.1			(762) *		
	Math credits	0.1			0.3			-0.4			183		
	SLMP[2] credits	-0.4			0.2			0.2			(491)		
	English credits	0.3			-0.2			-0.2			1,501 *		
	Vocational credits	0.1			0.1			-0.2			(173) *		
	Total credits	0.0			-0.1			0.1			569 *		
			0.014	1.80		0.018	**2.20**		0.018	**2.18**		0.019	**2.43**
Work experience	Hours worked 0 to 14	-1.8			1.1			0.7			(182)		
	Hours worked 15 to 21	-0.3			-0.1			0.5			(565)		
	Hours worked 22 to 29	-0.2			0.2			0.0			1,894		
	Hours worked 30 plus	0.3			-0.6			0.3			434		
	Hours worked missing	3.1			-2.3			-0.8			(13)		
			0.005	0.68		0.017	2.47		0.008	1.23		0.009	1.37
Work experience with co-op program	Hours worked 0 to 14	-1.7			1.1			0.6			(201)		
	Hours worked 15 to 21	-0.4			-0.1			0.5			(546)		
	Hours worked 22 to 29	-0.2			0.2			0.0			1,907		
	Hours worked 30 plus	0.3			-0.6			0.4			443		
	Hours worked missing	3.1 *			-2.3			-0.8			(19)		
	Participated in co-op	1.2			-0.5			-0.7			(321)		
			0.005	0.64		0.017	**2.11**		0.01	1.26		0.009	1.16
Specialization	College prep	-1.2			0.8			0.5			(1,315)		
	Sampler	-1.9			0.0			1.9			(1,842)		
	Limited concentrator	2.5			0.4			-2.9 *			2,144		
	Vocational concentrator	1.3			-1.2			-0.1			(1,114)		
			0.004	0.77		0.006	1.17		0.003	0.49		0.006	1.18

Table B.4—Regression equations for 1991 labor market outcomes for male non-college-bound high school graduates, controlling for test scores —Continued

		Weeks employed coefficient	Change in R squared	F value	Weeks unemployed coefficient	Change in R squared	F value	Weeks NILF[1] coefficient	Change in R squared	F value	Earnings coefficient	Change in R squared	F value
Program area	Academic track	-0.1			-0.1			0.3			299 *		
	Vocational track	-0.5			-0.2			0.7			(1,073)		
	Both	-0.1			0.7			-0.6			217		
			0.005	1.24		0.015	**3.76**		0.002	0.55		0.004	0.91
Vocational concentration	Agriculture	0.0			0.3			-0.3			(2,501)		
	Business	4.7			-2.4			-2.2			2,074		
	Marketing	4.0			-1.7			-2.3			1,383		
	Health	-22.2			8.4			13.8			(1,358)		
	Occupational health	5.4 *			-2.4			-3.0			1,517		
	Trade and industry	1.2			0.4			-1.6			(1,626)		
	Technology	5.1			-2.3			-2.7			1,018		
			0.003	0.29		0.012	1.26		0.005	0.56		0.006	0.62
Advanced English and mathematics	Taken advanced English	1.6			0.2			-1.8 *			2,383		
	Taken Algebra 1	1.1			-0.3			-0.8			1,221		
	Taken geometry	0.3			-0.4			0.1			(739)		
	Taken other advanced math	0.1			0.0			-0.2			942		
			0.013	**2.40**		0.005	0.89		0.007	1.31		0.009	1.69
Academic grades	Grades mostly A	1.1			0.2			-1.4 *			1,584		
	Mostly B	1.0			-0.6			-0.3			1,368		
	Mostly C	-1.6			0.1			1.5			(2,086) *		
			0.004	0.97		0.006	1.17		0.006	1.58		0.007	1.73
Academic and vocational grades	Grades mostly A	1.5			0.0			-1.6 *			2,241		
	Mostly B	1.0			-0.7			-0.4			1,530		
	Mostly C	-2.1			0.4			1.8			(2,620)		
	SLMP[2] grade mostly A	-0.9			0.6			0.3			(2,427)		
	SLMP[2] mostly B	0.4			-0.1			-0.2			210 *		
	SLMP[2] mostly C	1.1			-0.4			-0.7			180 *		
	SLMP[2] missing	0.4			-0.7			0.3			2,563		
			0.006	0.64		0.009	0.92		0.016	1.72		0.014	1.53

[1]NILF indicates not in the labor force.

[2]SLMP indicates specific labor market preparation.

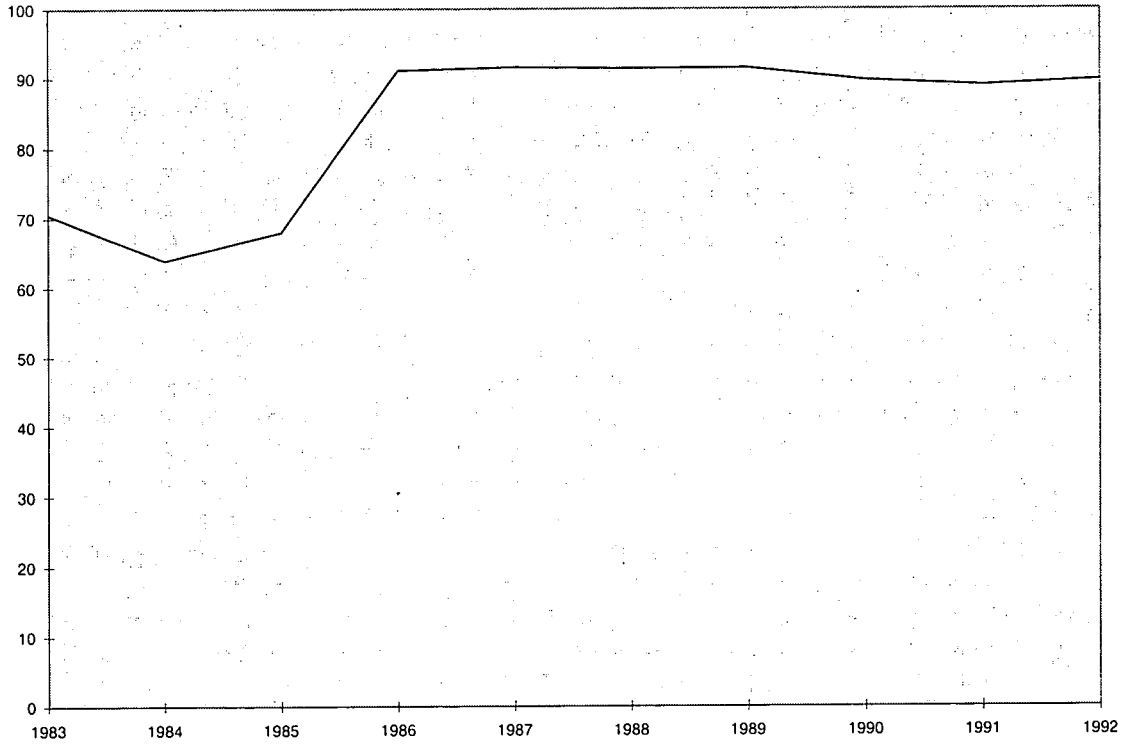
NOTE: An asterisk beside the coefficient indicates that the variable is statistically significant at a 95 percent level of confidence; a bolded F-value indicates that the set of new variables explains a statistically significant amount of variance in the dependent variable for that equation. Numbers in parentheses are negative.

SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980–1992.

Appendix C—Issues With the Fourth Follow-up Data

There appears to be some sort of discrepancy in the self-reported employment status data between the Third Follow-up data in 1985–86 and the Fourth Follow-up data in 1992. For example, the following figure plots the percentage of students who responded, "employed" for each year from 1983 through 1992. The data for 1983 to 1985 were reported in the 1985 Third Follow-up; the data for 1986 to 1992 were reported in the 1992 Fourth Follow-up.

Figure 1—Percentage of students who responded "employed" for each year from 1983 through 1992



SOURCE: U.S. Department of Education, National Center for Education Statistics, High School and Beyond: 1980 Sophomore Cohort, 1980-1992.

A simple interpretation of the above figure would be that on average, graduates from the 1980 sophomore cohort "settled down" in terms of employment about 4 years after graduation and enjoyed remarkable stability in overall employment rates through 1992. However, 1986 is also the first year in which Fourth Follow-up data are used, and the first year in which respondents were asked to recall employment status from such a long time in the past. Some simple correlations among the employment status of students 1983 to 1985 and 1986 to 1992 were run. Those for the latter years (1986 to 1992) are surprisingly high—not only are overall rates stable, but individual status is also remarkably stable. Fortunately, there are several months in 1986 in which we have overlap in data for some proportion of students. Programmer Ellen Liebman, a consultant to MPR Associates, was able to examine the match between what respondents said about their 1986 employment status in the Fourth Follow-up compared with the Third Follow-up.

The following table shows the correspondence of the Third Follow-up data with the Fourth Follow-up data for January 1986 (8601) and February 1996 (8602). In the cross-tabulations the codes are as follows:

Y4302A01

-1=missing
1=employed
2=unemployed
4=nilf

Table C1—January 1986 data reported in the Third Follow-up Survey and the Fourth Follow-up data

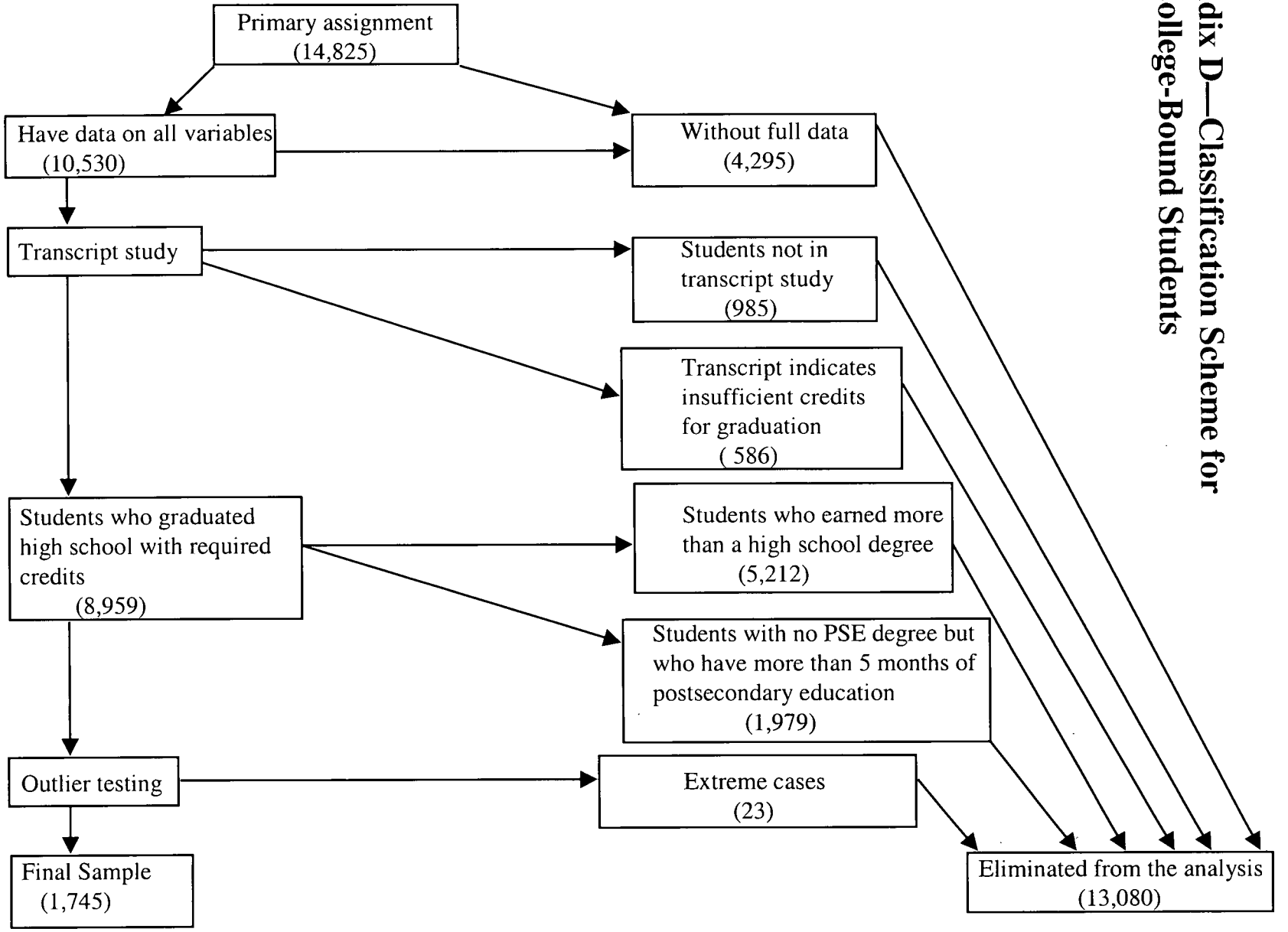
STAT8601	Y4302A01	Frequency	Percent	Cumulative frequency	Cumulative percent
1	-1	13.269	0.4	13.269	0.4
1	1	2,113.717	56.3	2,126.986	56.6
1	2	66.232	1.8	2,193.218	58.4
1	4	153.251	4.1	2,346.469	62.5
2	-1	2.576	0.1	2,349.045	62.5
2	1	141.679	3.8	2,490.724	66.3
2	2	63.726	1.7	2,554.450	68.0
2	4	55.485	1.5	2,609.935	69.5
4	-1	11.325	0.3	2,621.260	69.8
4	1	626.846	16.7	3,248.106	86.4
4	2	131.535	3.5	3,379.641	89.9
4	4	377.690	10.1	3,757.331	100.0

Table C2—February 1986 data reported in the Third Follow-up Survey and the Fourth Follow-up data

STAT8602	Y4302A02	Frequency	Percent	Cumulative frequency	Cumulative percent
1	-1	13.863	0.4	13.863	0.4
1	1	2,107.936	56.1	2,121.799	56.5
1	2	70.082	1.9	2,191.881	58.3
1	4	142.738	3.8	2,334.619	62.1
2	-1	2.576	0.1	2,337.195	62.2
2	1	136.120	3.6	2,473.315	65.8
2	2	56.455	1.5	2529.770	67.3
2	4	52.902	1.4	2,582.672	68.7
4	-1	9.532	0.3	2,592.204	69.0
4	1	638.249	17.0	3,230.453	86.0
4	2	134.021	3.6	3,364.474	89.5
4	4	392.857	10.5	3,757.331	100.0

As can be seen, there is about 70 percent agreement from the two sources, about 30 percent disagreed, and the response to the STAT8602 variable was temporally nearer than the response to Y4302A02. Our recommendation is to put more faith in the earlier data. It seems plausible that in 1992 respondents just could not recall accurately their employment status of 6 years ago. If they were employed in 1992 many may have assumed that they were also employed in 1986 (this would explain the remarkably high correlations year to year for 1986 to 1992), or some other sort of bias other than recall crept into the data (fatigue perhaps). In any event we are not comfortable using data that relies on recall of employment status from so many years in the past.

Appendix D—Classification Scheme for Non-College-Bound Students



Appendix E—Glossary

This glossary describes the variables used in this report. These items were taken directly from the HS&B Fourth Follow-up Data Analysis System (DAS), an NCES software application that generates tables directly from Fourth Follow-up data files. A description of the DAS files can be found in appendix F.

Glossary Index

DEMOGRAPHIC AND STATUS VARIABLES

Race/ethnicity **RACE4**

This is a composite variable that draws upon information from the Fourth Follow-up and from earlier surveys. Two versions of this variable appear in the tables of this report, but the only difference between these variables is that one version distinguishes among Hispanics by their country of origin, while the other version contains a single Hispanic category.

American Indian/Alaskan Native	A person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliation or community recognition.

Asian/Pacific Islander	A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or Pacific Islands. This includes people from China, Japan, Korea, the Philippine Islands, Samoa, India, and Vietnam.
Black, non-Hispanic	A person having origins in any of the black racial groups of Africa, except those of Hispanic origin.
White, non-Hispanic	A person having origins in any of the original peoples of Europe, North Africa, or the Middle East (except those of Hispanic origin).
Hispanic	A person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

Sex **SEX**

Male
Female

Socioeconomic status (SES) composite 1980 **BYSES**

BYSES in the Fourth Follow-up is a percentile composite based on the variable BYSES from the 1980 base-year file. Originally, this variable was coded as a standard normal variable with a zero mean and a variance of 1, and it was a composite score based on the average non-missing values for father's occupation, father's education, mother's education, family income, and material possessions in the home. The original standardized test score composite was converted to a percentile format by ranking students on an index that ranged from 1 to 100. The variable had the following format:

Low quartile	Students whose percentile rank ranged from 1 to 25 percent.
Middle two quartiles	Students whose percentile rank ranged from 26 to 75 percent.
High quartile	Students whose percentile rank ranged from 76 to 100 percent.

EMPLOYMENT VARIABLES

Earnings in 1983 and 1991 (self-reported) **STAT8602 AND Y4301B9**

Earnings are stored as a continuous variable. Earnings were reported by respondents on an annual basis from 1983 through 1991.

Employment status February 1983 and 1992 **EMST8302 and EMST9202**

The HS&B Data Analysis System files contain a monthly employment status variable for each respondent from January 1986 through June 1992, although missing data are a problem for the months after February 1992. Each monthly employment status variable includes four categories.

Working	Employed in the month specified, either full time or part time.

Unemployed, receiving benefits	Unemployed in the month specified and receiving unemployment benefits.
Unemployed, not receiving benefits	Unemployed in the month specified, but not receiving any unemployment benefits
Out of the labor force	Not employed for pay outside the home. This category also includes discouraged workers who are not looking for work.

HIGH SCHOOL VARIABLES

Credits in academic areas **CTI**

Number of credits taken in various subject areas according to high school transcript data. Courses were coded into subject areas using the Secondary School Taxonomy (SST). This variable counts the number of credits taken in all academic subjects, including mathematics, science, English, social studies, fine arts, and foreign languages.

Credits in English **CTI3**

Number of credits taken in English according to high school transcript data. Courses were coded into subject areas using the Secondary School Taxonomy (SST). This variable counts the number of credits taken in English, as well as in literature, composition and writing, and speech.

Credits in mathematics **CTI1**

Number of credits taken in mathematics according to high school transcript data. Courses were coded into subject areas using the Secondary School Taxonomy (SST). This variable counts the number of credits taken in basic (remedial) mathematics, general mathematics, applied mathematics, pre-algebra, algebra, geometry, Calculus and other advanced mathematics.

Credits in vocational areas **CTII**

Number of credits taken in all vocational areas according to high school transcript data. Courses were coded into subject areas using the Secondary School Taxonomy (SST).

Credits in specific labor market preparation courses **CTII.c**

A subset of credits in vocational areas, this variable measure the number of credits taken in specific labor market preparation areas according to high school transcript data. This variable counts the number of credits taken in agriculture, business, marketing and distribution, health, occupational home economics, trade and industry, and technical and communication areas. Courses were coded into subject areas using the Secondary School Taxonomy (SST).

Total credits **SST_TOT**

Total number of credits taken according to high school transcript data. Courses were coded into subject areas using the Secondary School Taxonomy (SST).

Less than Algebra 1 **CTI1**

According to high school transcript data, no mathematics course equivalent to Algebra 1 or higher was completed. Courses were coded into subject areas using the Secondary School Taxonomy (SST).

Algebra 1 **CTI1**

According to high school transcript data, a course equivalent to Algebra 1 was completed. Courses were coded into subject areas using the Secondary School Taxonomy (SST).

Geometry **CTI1**

According to high school transcript data, a course equivalent to geometry was completed. Courses were coded into subject areas using the Secondary School Taxonomy (SST).

Calculus and advanced mathematics credits **CTI1**

According to high school transcript data, a course equivalent to Calculus and advanced mathematics was completed. Courses were coded into subject areas using the Secondary School Taxonomy (SST).

No advanced English **CTI31G**

According to high school transcript data, no course equivalent to advanced English was completed. Courses were coded into subject areas using the Secondary School Taxonomy (SST).

Grades in high school **SST_GPA**

Grade-point average (GPA) was calculated from high school transcripts. All grading systems were standardized to a 4.0 scale.

Mostly A's	Cumulative high school GPA was 3.50 or higher.
Mostly B's	Cumulative high school GPA was between 2.80 and 3.49.
Mostly C's	Cumulative high school GPA was between 1.80 and 2.79.
Mostly D's or lower	Cumulative high school GPA was lower than 1.80.

Grades in specific labor market preparation courses **SLMPGPA**

Grade-point average (GPA) in specific labor market preparation (SLMP) courses was calculated from high school transcripts. All grading systems were standardized to a 4.0 scale.

Mostly A's	Cumulative SLMP GPA was 3.50 or higher.
Mostly B's	Cumulative SLMP GPA was between 2.80 and 3.49.
Mostly C's	Cumulative SLMP GPA was between 1.80 and 2.79.
Mostly D's or lower	Cumulative SLMP GPA was lower than 1.80.

Number of hours worked in 11th grade **FY37**

The First Follow-up Survey asked students in their senior year of high school the following: "During the school year before this one, about how many hours per week on the average did you work for pay outside your own home?"

None
1–14 hours per week
15–29 hours per week
30 or more hours per week

Co-op **FY11A**

Student participated in a co-op program in high school.

Program in high school **HSPROG**

General	Students reported that their high school program was neither vocational nor academic.
Academic	Students reported that their high school program was academic.
Vocational	Students reported that their high school program was vocational.
Both	Students met the criteria in both academic and vocational categories.

Program specialization **CTII and CTII.C**

College prep	Students completed 4 or more credits in English; 3 or more credits in mathematics, with at least 1 credit in algebra or higher; 3 or more credits in science, with at least 1 credit in advanced biology, chemistry, or physics; and 2 or more credits in a single foreign language.
Vocational concentrator	Students must have completed at least 4 credits in a single SLMP field, 2 of which must be at the level of the second course or higher in the sequence.
Sampler	Students who completed at least one course in a vocational area, and less than three courses in an SLMP field.
Limited concentrator	Students who completed more than three courses in a vocational area, but less than three courses in an SLMP field.

Vocational concentration **CTII.C**

None	Student did not complete 3 or more credits in any SLMP area.
Agriculture	Student completed 3 or more credits in agriculture (CTII.C.1).
Business	Student completed 3 or more credits in business (CTII.C.2).

Marketing	Student completed 3 or more credits in marketing (CTII.C.3).
Health	Student completed 3 or more credits in health (CTII.C.4).
Occupational home economics	Student completed 3 or more credits in occupational home economics (CTII.C.5).
Trade and industry	Student completed 3 or more credits in trade and industry (CTII.C.6).
Technology/communications	Student completed 3 or more credits in technology/communications (CTII.C.7).

Mathematics test score 1982 **BBMATH**

BBMATH is the standardized test score for mathematics assessment conducted in the base year of HS&B in 1980.

Appendix F—Technical Notes and Methodology

The High School and Beyond Fourth Follow-up

The High School and Beyond (HS&B) survey began in the spring of 1980 with the collection of base-year questionnaire and test data on more than 58,000 high school seniors and sophomores. The First Follow-up Survey was conducted in the spring of 1982, the Second Follow-up in the spring of 1984, the Third Follow-up in the spring of 1986, and the Fourth Follow-up in the spring of 1992.

The HS&B Fourth Follow-up Survey is the fifth wave of the longitudinal study, but unlike previous rounds, the Fourth Follow-up focused exclusively on the 1980 sophomore class. The Fourth Follow-up included two components: a respondent survey with a sample of 14,825 members of the 1980 sophomore cohort, and a transcript study based on the sophomore cohort members who reported postsecondary attendance. The goals of the Fourth Follow-up were to obtain information on issues of access to and choice of undergraduate and graduate educational institutions, persistence in attaining educational goals and progress through the curriculum, rates of degree attainment and of other educational outcomes, and labor market outcomes in relation to educational attainment and labor market experiences.

Sample design. In the base year, students were selected using a two-stage, stratified probability sample design with schools as the first-stage units and students within schools as the second-stage units.[33] The total number of schools selected for the sample was 1,122, from a frame of 24,725 schools with grades 10 or 12 or both. Within each stratum, schools were selected with probabilities proportional to the estimated enrollment in their 10th and 12th grades. Within each school, 36 seniors and 36 sophomores were randomly selected. In those schools with fewer than 36 seniors or 36 sophomores, all eligible students were drawn in the sample.

The First Follow-up sophomore and senior cohort samples were based on the HS&B base-year samples, retaining the essential features of a stratified multi-stage design.[34] Subsequent to the First Follow-up Survey, high school transcripts were sought for a probability subsample of

[33]For further details on the base-year sample design, see M. Frankel, L. Kohnke, D. Buonanno, and R. Tourangeau, *High School and Beyond Sample Design Report* (Chicago: National Opinion Research Center, 1981).

[34]For further details, see R. Tourangeau, H. McWilliams, C. Jones, M. Frankel, and F. O'Brien, *High School and Beyond First Follow-up (1982) Sample Design Report* (Chicago: National Opinion Research Center, 1983).

nearly 18,500 members of the 1980 sophomore cohort. The subsampling plan for the transcript study emphasized retaining members of subgroups of special relevance for education policy analysis. Compared with the base-year and First Follow-up Surveys, the transcript study sample design further increased the overrepresentation of racial and ethnic minorities (especially those with above average HS&B achievement test scores); students who attended private high schools; school dropouts; transfers and early graduates; and students whose parents participated in the base-year Parent's Survey on financing postsecondary education.

The samples for the Second and Third Follow-up Surveys of the 1980 sophomore cohort were based on the transcript study design. A total of 14,825 cases were selected from among the 18,500 retained for the transcript study. As was the case for the transcript sample, the sophomore cohort Second and Third Follow-up samples included disproportionate numbers of sample members from policy-relevant subpopulations (e.g., racial and ethnic minorities, students from private high schools, high school dropouts, students who planned to pursue some type of postsecondary schooling, and so on).[35] The members of the senior cohort who were selected into the Second Follow-up sample consisted exactly of those selected into the First Follow-up sample. The Third Follow-up was the last follow-up conducted for the senior cohort.

The Fourth Follow-up was composed solely of members from the sophomore cohort. The members of the sophomore cohort selected into the Fourth Follow-up sample consisted exactly of those selected into the Second and Third Follow-up samples. For any student who ever enrolled in postsecondary education, complete transcript information was requested from the institutions indicated by the student.

Sample weights. The general purpose of weighting is to compensate for the unequal probability of selection into the sample and to adjust for respondent nonresponse to the survey. The weights are based on the inverse of the selection probabilities at each stage of the sample selection process and on nonresponse adjustment factors computed within weighting cells. The Fourth Follow-up had two major components: the collection of survey data and the collection of postsecondary transcript data. Nonresponse occurred during both of these data collection phases, and weights were computed to account for nonresponse during either phase. For the survey data, two weights were computed. The first weight (FU4WT) was computed for all Fourth Follow-up respondents. The second weight (PANEL5WT) was computed for all Fourth Follow-up respondents who also participated in the base-year and First, Second, and Third Follow-up Surveys. This report used PANEL5WT for all analyses. For more information about the design and im-

[35]See tables 2.4-1 through 2.4-4 of C. Jones and B.D. Spencer, *High School and Beyond Second Follow-up (1984) Sample Design Report* (Chicago: National Opinion Research Center, 1985).

plementation of the survey weights, see *The High School and Beyond Fourth Follow-up Methodology Report*.[36]

Accuracy of Estimates

The estimates in this report are derived from samples and are subject to two broad classes of error—sampling and nonsampling error. Sampling errors occur because the data are collected from a sample of a population rather than from the entire population. Estimates based on a sample will differ somewhat from the values that would have been obtained from a universe survey using the same instruments, instructions, and procedures. Nonsampling errors come from a variety of sources and affect universe surveys as well as sample surveys. Examples of sources of nonsampling error include design, reporting, and processing errors and errors due to nonresponse. The effects of nonsampling errors are more difficult to evaluate than those that result from sampling variability. As much as possible, procedures are built into surveys to minimize nonsampling errors.

The standard error is a measure of the variability due to sampling when estimating a parameter. It indicates how much variance there is in the population of possible estimates of a parameter for a given sample size. Standard errors can be used as a measure of the precision expected from a particular sample. The probability that a complete census would differ from the sample by less than the standard error is about 68 out of 100. The chances that the difference would be less than 1.65 times the standard error are about 90 out of 100, and that the difference would be less than 1.96 times the standard error, about 95 out of 100.

Methodology and Statistical Procedures

The comparisons in the text have all been tested for statistical significance to ensure that the differences are larger than those that might be expected due to sampling variation. Two types of comparisons have been made in the text.

Differences in two estimated percentages. The Student's *t* statistic can be used to test the likelihood that the differences between two percentages are larger than would be expected by sampling error.

[36]D. Zahs, S. Pedlow, M. Morrissey, P. Marnell, and B. Nichols, *The High School and Beyond Fourth Follow-up Methodology Report* (U.S. Department of Education, National Center for Education Statistics, Postsecondary Longitudinal Studies Branch, 1994), section 3.

$$t = \frac{P_1 - P_2}{\sqrt{se_1^2 + se_2^2}}$$

where P_1 and P_2 are the estimates to be compared and se_1 and se_2 are their corresponding standard errors.

As the number of comparisons on the same set of data increases, the likelihood that the *t* value for at least one of the comparisons will exceed 1.96 simply due to sampling error increases. For a single comparison, there is a 5 percent chance that the *t* value will exceed 1.96 due to sampling error. For five tests, the risk of getting at least one *t* value that high increases to 23 percent, and for 20 comparisons, to 64 percent.

One way to compensate for this danger when making multiple comparisons is to adjust the alpha level to take into account the number of comparisons being made. The alpha rate is the probability of falsely rejecting the hypothesis that there are no differences between groups in the population. For example, rather than establishing an alpha level of 0.05 for a single comparison, the alpha level is set to ensure that the likelihood is less than 0.05 that the *t* value for any of the comparisons exceeds the critical value by chance alone when there are truly no differences for any of the comparisons. One such adjustment, the Bonferroni adjustment used here, is calculated by taking the desired alpha level and dividing it by the number of possible comparisons, based on the variable(s) being compared. The *t* value corresponding to the revised, lower alpha level must be exceeded in order for any of the comparisons to be considered significant. For example, to test for differences in dropout rates among whites, blacks, Hispanics, and Asians/Pacific Islanders, the following steps would be taken:

- Establish the number of comparisons—in this case, six (whites and blacks; whites and Hispanics; whites and Asians/Pacific Islanders; blacks and Hispanics; blacks and Asians/Pacific Islanders; Hispanics and Asians/Pacific Islanders). The number of two-way comparisons that can be made equals [(n)(n-1)]/2, where n is the number of variable categories. Thus, with four categories the number of possible comparisons is [(4)(3)]/2 = 6.
- Divide the desired alpha level, 0.05, by the number of comparisons (e.g., six) to obtain the new alpha level (0.05/6 = 0.0083).
- Consult a table of *t* statistics (or the standard normal table for *z* values if the N is large) to find the *t* value that corresponds to that alpha (*t* = 2.64 for alpha = 0.0083).

All comparisons in this report were tested using the Bonferroni adjustment for the *t* tests. Where categories of two variables were involved, the number of comparisons used to make the Bonferroni adjustment was based on the relationship(s) being tested.

Regression Analysis. Given that all of the outcome variables in this analysis were continuous, the estimation procedure used in the regression analysis was ordinary least squares (OLS). To account for the effect on variances of the complex sampling in HS&B, the regression procedure within the software package SUDAAN was used. The Taylor series linearization method for estimating regression coefficients and their associated variances was used. For further information on SUDAAN see: http://www.rti.org/units/shsp/sud1.cfm

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